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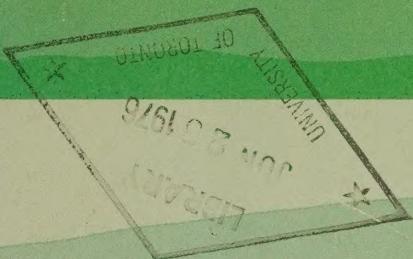
MINISTRY OF THE ENVIRONMENT

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Government
Publications

175



METRO TORONTO RECYCLING DIRECTORY



That's what you and other Torontonians are doing every garbage collection day. Residents of Metropolitan Toronto generate approximately two million tons of garbage each year. Two million tons of valuable and scarce resources that are either burned or dumped in landfill sites. It costs us, as taxpayers, more than forty million dollars each year to collect and dispose of this garbage.

Recycling of materials involves substantial energy savings. For example, 74% of manufacturing energy is saved when steel is recycled and 17 trees are saved when one ton of paper is recycled. A conscientious effort at garbage reduction in the home by avoiding over-packaged products and disposable items in addition to recycling will help to cut the cost of garbage disposal and lessen the need for unattractive and environmentally damaging landfill sites. So here's a place to start...

DEPOT LIST

MAP REFERENCE AND LOCATION	MATERIALS
1. 425 Old Weston Rd., east side, north of St. Clair Ave. W. (Public Works Yard)	Bottles and Cans
3. 1116 King St. W., north side, two blocks east of Dufferin St., opposite Fraser Ave. (Public Works Yard)	Bottles and Cans
4. Pears Ave., south side of Ramsden Park, west of Yonge St. (Public Works Yard)	Bottles and Cans
5. 381 Greenwood Ave., east side of Walpole Ave., south of C.N.R. Crossing (Public Works Yard)	Bottles and Cans
6. 30 St. Lawrence St., west side, south of King St. E., one block west of River St. (Public Works Yard)	Bottles and Cans
7. 2721 Danforth Ave., between Main St. and Dawes Rd., in Darrigo's parking lot	Bottles and Cans
8. Bayview Ave. and Eglinton Ave., centre of Dominion Store parking lot	Bottles and Cans
9. Bayview Ave., west side, north of Davisville Ave., in front of Dominion Store parking lot	Bottles and Cans
10. Yonge St., west side at Bedford Park Ave., rear of A & P parking lot	Bottles and Cans
11. 723 College St., Shaw St. side of Miracle Mart	Bottles and Cans
12. St. Clair Ave. W., north side, east of Bathurst St., east side of Loblaws parking lot	Bottles and Cans
13. Rose Ave., west side, south of Prospect St., Winchester School	Bottles and Cans
14. 17 Broadway Ave., south side, east of Yonge St., North Toronto Collegiate	Bottles and Cans
15. Castlefield Ave., south side, just east of Bathurst St.	Bottles and Cans
16. Towers-Loblaws shopping centre, east side of Dundas St., first block south of Bloor St.	Bottles and Cans
17. Subway grounds at Broadview Ave., and Danforth Ave.	Bottles and Cans
18. Brewers Retail parking lot, north side of Dupont St., west of Bathurst St.	Bottles and Cans
19. 95 Regal Rd., Regal Road Public School	Bottles and Cans
21. Jarvis Collegiate, southeast corner of Jarvis St. and Wellesley St., on south side of School	Bottles only (clear only)
22. Bathurst St. and Lawrence Ave., southwest corner, in Lawrence Plaza parking lot	Bottles and Cans
23. DeHavilland Plaza, Keele St. and Sheppard Ave.	Bottles and Cans
24. North York Sheridan Mall, Jane St. and Wilson Ave.	Bottles and Cans
25. Don Mills Rd. and Finch Ave., Esso Station	Bottles only (colours mixed)

HOURS: Unless otherwise indicated, the depots are open all the time.

INSTRUCTIONS:

BOTTLES: Separate bottles by colour — clear, green or brown. (Some depots do not require the bottles to be separated by colour. If this is the case, the listing in the MATERIALS column will read, "Bottles-colours mixed". If "Bottles" appears alone, it means that the colours must be separated.) Do not include white, blue, window, pyrex or light bulb glass. Remove labels if they are metallic. Remove all plastic and metallic neck rings or tops.

CANS: Remove paper labels. Rinse and flatten. Do not include aluminum foil or plates.

DEPOT LIST

MAP REFERENCE AND LOCATION	MATERIALS
26. Richview Firehall (Islington Ave. below Eglinton Ave.)	Bottles only (colours mixed)
27. Royal York Rd. Firehall (Royal York Rd. north of the Queensway)	Bottles only (colours mixed)
28. Kipling Ave. Firehall (Kipling Ave. north of Rexdale Rd.)	Bottles only (colours mixed)
29. New Toronto Firehall (Eighth St. north of Lakeshore Blvd.)	Bottles only (colours mixed)
30. Renforth Drive Firehall (Renforth Dr. north of Rathburn Rd.)	Bottles only (colours mixed)
31. Alderwood Firehall (Luness Dr. north of Horner Ave.)	Bottles only (colours mixed)
32. Continental Can, 70 Birmingham St., east of Islington Ave.	Cans only
33. Consumers Glass Ltd., 777 Kipling Ave., north of the Queensway	Bottles only Mon.-Fr. 9:00 am-4:30 pm Sat. 9:00 am-3:00 pm
34. 1401 Castlefield Ave. just west of Caledonia Rd., Works Yard	Bottles only (colours mixed).
35. Firehall at Jane St., just south of Dundas St.	Bottles only (colours mixed)
36. Scarborough Works Yard, northwest corner of Midland Ave. and Ellesmere Rd.	Bottles (colours mixed), Cans, Newspaper, Waste Motor Oil
37. 1583 Kingston Rd., at Birchcliffe Ave., in BP Station	Bottles (colours mixed) and Cans
38. Morningside Yard, just south of Hwy. 401 on Morningside Ave.	Bottles (colours mixed), Cans and Newspaper
39. General Electric Parking Lot, Lawrence Ave. E. and Port Union Rd. just west of Rougehill GO Station	Bottles and Cans Sat. 10 am-12 noon

PAPER PICK-UP

BOROUGH	COLLECTION SCHEDULE	CONTACT	SPECIAL INFORMATION
Toronto—City	Wednesdays before 7 am. No collections in weeks with holidays.	For missed pick-ups, call 367-7742. For general information, call TRAC at 367-7850.	Area bounded by Jarvis St. and Spadina Ave., south of Bloor St. has no regular pick-up. Call 367-7742 to arrange a pick-up.
East York	Once a week: Mon., Tues., Thurs. or Fri., depends on the area	429-0822	
York—south of Eglinton Ave.	Once a week: Mon.-Fri., depends on the area.	469-5907	
York—north of Eglinton Ave.	Mondays by 7:30 am	495-6313	
North York	Once a week: Mon.-Fri., depends on the area	495-6313	
Scarborough	Once a week: Mon.-Fri., depends on the area.	495-6313	
Etobicoke	Wednesdays before 7 am. No collections in weeks with holidays.	626-4202	

INSTRUCTIONS: Bundle papers with string. Do not include magazines or other used products.

CAZNEU

-A56



To:

*The Honourable
James A. C. Auld, Minister.*

Sir,

*I have the honour to submit
for your approval the 1972/73
annual report of the
Ministry of the Environment.*

Respectfully submitted,

Everett Biggs.

EVERETT BIGGS
DEPUTY MINISTER



To:

*His Honour,
The Lieutenant-Governor
of the Province of Ontario.*

May it please Your Honour,

*I have the honour to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1972 and ending
March 31, 1973.*

Respectfully submitted,

James A.C. Auld

JAMES A.C. AULD
MINISTER

Preface

The Province of Ontario was one of the first jurisdictions in the world to develop a comprehensive program of environmental protection, rehabilitation and management.

Just one year ago, the various components of this environmental program were assembled within the sphere of one agency — the Ministry of the Environment.

This incorporation marked the disappearance of a proud name — the Ontario Water Resources Commission. In the 15 years of its operation, the OWRC established a program of water management and pollution control and a record of achievement that were examples for the world.

The younger agencies, the Air and Waste Management Branches, the Pesticides Control Service and the Private Waste and Water Branch, all parts of what was the Department of the Environment, had already established active and effective programs at the time of reorganization.

I am proud to say that these programs remained active and effective throughout the past year of preparing new legislation, new structures and new approaches to environmental problems.

In the past year, a considerable effort has been directed into refining the Ministry's legislation and regulation structure and correlating its programs to

provide the comprehensive environmental approach for which this Ministry was designed.

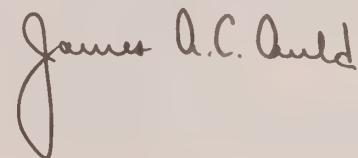
The Environmental Protection Act, 1971, the program keystone, was amended to provide an even more effective basis for regulation and enforcement.

The Pesticides Control Act was amended to better protect the public from the abuse of pesticides.

During the year, the Environmental Hearing Board was established to review the environmental issues involved in private and governmental developments and to provide recommendations.

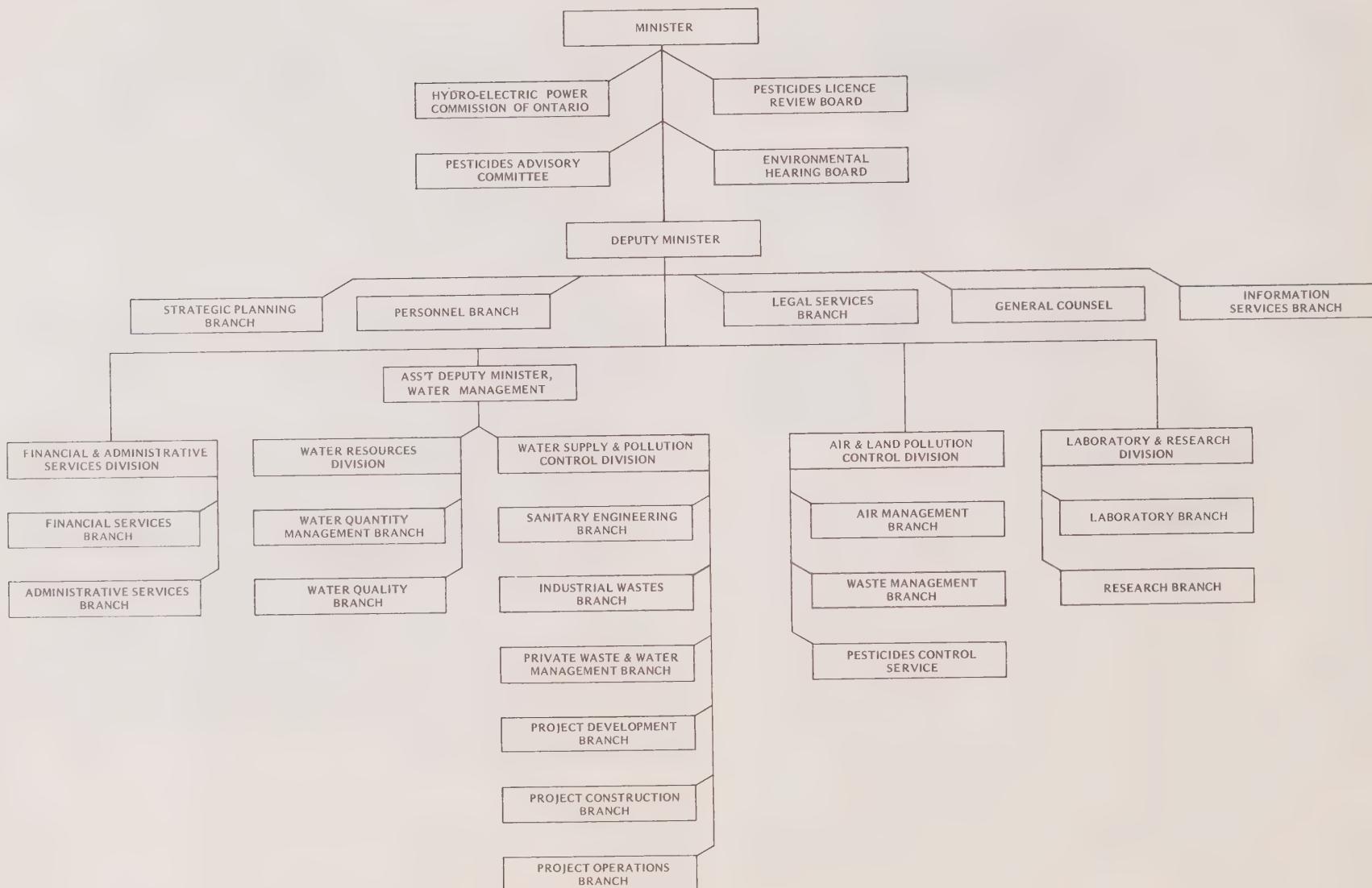
A regulation banning three-quart disposable plastic milk jugs and a further ban on three-quart paper jugs to take effect in November, 1973, were part of an increasing waste management program.

Late in 1973, the Ministry formed the Task Force on Solid Waste, with representatives from industry, consumer groups, environmental groups and governments preparing reports on waste issues during 1973. These reports will help in the development of further waste control, treatment and reclamation programs.





MINISTRY OF THE ENVIRONMENT ORGANIZATION CHART MARCH 31, 1973



CONTENTS

6	OPERATING DIVISIONS
6	Air and Land Pollution Control
6	Air Management
10	Pesticides Control
13	Waste Management
14	Water Resources
14	Water Quality
18	Water Quantity
22	Water Supply and Pollution Control
22	Industrial Wastes
26	Private Waste and Water Management
28	Sanitary Engineering
32	Project Construction
33	Project Development
34	Project Operations
36	MANAGEMENT AND OPERATIONS SUPPORT SERVICES
37	Pesticides Advisory Committee
37	Pesticides Licence Review Board
38	Information Services
39	Legal Services
39	Personnel
40	Strategic Planning
41	Financial and Administrative Services
41	Administrative Services
43	Financial Services
44	Laboratory and Research
45	Laboratory
47	Research

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Air and Land Pollution Control

Operating Divisions

AIR MANAGEMENT

Abatement

During 1972/73 the Abatement Section has laid considerable stress on increasing its effectiveness and improving its service to the public. The work has included systematic collecting and processing of source emission data, formulating control programs to abate air contamination, and responding to complaints from the citizens of Ontario. In addition, the section is implementing advanced air management techniques to achieve the air quality goals. To this end, an information storage and retrieval system for use by all staff is being provided.

In the fiscal year, a total of 1,070 industrial and commercial installations were surveyed. Resulting from these, 23 detailed surveys under Section 83 of The Environmental Protection Act, 1971 were completed; 31 companies were issued with a Notice of Intent to issue a Control Order; 17 Orders were issued; and 14 companies elected to submit a formal abatement program. A further 27 companies submitted programs for approval as a result of action taken by abatement engineers and inspectors.

As part of this section's work, the following key industries have formally undertaken extensive abatement programs: the abrasives industry in Niagara Falls, terminal elevators in Thunder Bay, gold mines in Northern Ontario, meat packing plants in Toronto, automotive assembly plants, and teepee wood waste burners.

The Hydro Electric Power Commission received approval for a program to limit the discharge of airborne contamination from the Lakeview generating station west

of Toronto. A program to control odors from the municipal sewage plant in London and a program to abate emissions from Toronto's seven municipal incinerators were formalized.

At a cost of approximately \$78,800,000, 85 voluntary air pollution abatement programs were completed in 1972/1973. Of 133 Orders issued under The Air Pollution Control Act, 1967 (the formerly prevailing legislation), 32 have still to be completed.

In 1972/73, 24 air pollution court cases were heard, resulting in 15 convictions. Total fines for the year were \$8,625. Two Stop Orders were issued to prevent danger to the public health. The Air Pollution Index exceeded 50 on only 14 occasions. Of these 14 occasions, one occurred in Sudbury, and 13 in Happy Valley, a small community near Sudbury.

The abatement section, in collaboration with the Ontario Ministry of Agriculture and Food, continued its work in the evaluation of poultry and livestock farms with regard to the Code of Practice and the issuing of Certificates of Compliance. Of 459 applications received from farms, 441 were granted Certificates of Compliance.

The section also formed a group of interested engineers from several branches and ministries to investigate the uses for waste products presently disposed of in a manner that leaves room for improvement. Projects underway include the utilization of bark and wood wastes, elemental sulphur, the use of garbage as a fuel in cement and brick manufacture, and the use of whey from cheese manufacturing.

It is intended that these progressive trends will continue in the coming year as more and more modern management aids are adopted, and as increased coordination with other branches of the Ministry of Environment and other ministries is achieved.

Air Quality and Meteorology

In order to achieve a high quality of air in Ontario, this section has continued its efforts to add to the knowledge of contaminants present in the air, and to compare their measured concentrations with the air quality goals of the Ministry.

During the 1972/1973 season, the air quality sampling network was expanded to conduct surveys in 49 areas of Ontario, with over 900 monitoring instruments in operation. Sulphur dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, oxidants, fluorides, suspended particulate matter, dustfall, sulphation and fluoridation rates are continuously monitored, and atmospheric concentrations of metals such as lead, nickel, cadmium and arsenic are obtained.

Micrometeorological measurements of the wind speed and direction and temperature changes with heights are compiled continuously at several locations to interpret the air quality data and to determine the sources of the pollutants. The effects of these pollutants on property are determined analytically at a number of locations across the province over time periods varying from one month to one year.

Over 1.75 million data points were obtained and processed by Ontario Government computer facilities. The air quality data and interpretation are pub-

lished and made available to the public. Also published is the Air Pollution Index, provided via the news media four times daily for the cities of Toronto, Hamilton, Sudbury and Windsor.

Meteorological instrumentation was installed in a new 400 foot tower in Sudbury, Ontario and a meteorologically instrumented tower was added to our facilities in London, Ontario. A study of carbon monoxide in downtown Toronto was conducted, and air quality monitors were added at Cornwall, Dryden, Sudbury, Hawkesbury, Temagami and Welland.

Several other studies were carried out by the mathematical group of this section in 1972/73. Tests of pollution abatement and planning strategies for Toronto, Hamilton, Oakville, Kingston and Sudbury areas were conducted by computer simulation of atmospheric environment reactions to various pollutants emitted by all classes of sources during varying meteorological conditions.

A special building height study was completed. This will assist land use planners in determining the heights at which buildings may intercept plumes from large industrial sources, and whether the resulting concentrations of airborne contaminations are acceptable. If not, abatement action may be necessary.

An air quality model which simulates pollution stemming from street and highway traffic has been utilized for Toronto and Hamilton. In addition, the effects of one-way streets on a city's air quality in the downtown core were determined.

The staff of the Air Quality and Meteorology Section have provided advice to industry and departments of the federal and provincial governments other than Ontario. Lectures were presented at the invitation of the universities of Toronto, York and Waterloo, and several

papers were given at various technical conferences throughout the year.

Approvals

The bulk of the workload of the Approvals Section continued to consist of the assessment of Certificates of Approval. The total number of applications for certificates was 2,747 as compared with last year's total of 2,739. The number and size of the individual points of emission of airborne contamination involved in these applications for approval were unusually low. The total number of sources was reduced by 12%, and of the 5,971 sources dealt with in Certificates of Approval this year, 4,728 were associated with heating installations.

This section completed 270 assessments of claims for grants under the Pollution Abatement Incentive Act, 1970. Of the \$1,549,415 requested for these grants, \$857,076 has been recommended for approval. There are still 42 claims to be assessed, involving a total of \$434,959. Of the total amount claimed (\$1,549,415), \$257,370 was disallowed.

This year, the Approvals Section took a greatly enhanced role in the matter of planning and zoning in Ontario. Two hundred and fifteen subjects were studied by the Section, with 50% of the work being associated with reviews of official plans and amendments.

Section staff attended 25 meetings or hearings, and made ten field trips to investigate proposed subdivisions and redesignation of land usage matters. To ensure comprehensive coverage of all aspects of planning and zoning, officers of the Abatement Section provided data pertaining to the nature of most of the subjects involved.

To assist the Ontario Development

Corporation in their assessment of companies requesting financial assistance, the Approvals Section prepared comments and statements on matters of air pollution control in 174 companies.

Members of the staff have been involved with various committees dealing with such subjects as air pollution collection equipment efficiencies, feed and grain mill operations, whey processing and the control of petrochemical hydrocarbons. These committees have been formed with members of the relevant industries and industrial associations.

In addition, staff members participated on safety advisory committees, convened by the Atomic Energy Control Board, dealing with the Bruce Heavy Water Plant and the Eldorado Uranium Hexafluoride Plant.

Automotive Emission Control

This section continued to investigate, monitor and require the reduction of airborne contamination stemming from automotive sources.

Visual inspection of control systems and short or full measurement of vehicle emissions have been carried out through spot checks of on-road vehicles. Emphasis was placed on new car models and low frequency vehicles. From June to October, both mobile laboratories visited seven municipalities and Toronto suburbs, and made 3,300 tests for compliance with Canadian or suggested Ontario standards.

Monitoring of car emissions continued during the winter months and a second test centre at Taber Road, Rexdale was again opened in December, 1972. Over the one year period more than 6,200

tests were performed, most of them involving a short test designed to identify cars with high or excessive emissions. Approximately 27% of uncontrolled cars and 18% of controlled cars exhibited excessive carbon monoxide emissions, with a slightly lower percentage of cars showing excessive hydrocarbon emissions.

A special testing program, in which companies and individuals were given guidance in the development of retrofit control devices and in the monitoring of low emission vehicles using LPG or natural gas, was continued. However, only two of the devices tested showed promise of satisfactorily reducing pollution from older cars.

Several public demonstrations were made by this section, including an exhibition in Toronto, July, 1972, in which federal and provincial test facilities were shown during a preview to the Urban Vehicle Design Competition undertaken by North American universities.

In addition, the demonstration program, designed to acquaint colleges with various automotive pollution control procedures, was extended. A total of 22 visits were made to nine colleges from October, 1972 to March, 1973, with an estimated 1,770 trainees, mechanics and staff from local service stations participating. This program has resulted in a greatly increased interest by the colleges in automotive air pollution control. Many colleges started their own emission control or emission tune-up courses after purchasing emission testing equipment similar to that demonstrated by the province.

The section continued to investigate complaints concerning visible emissions from motor vehicles, to conduct observations of heavy duty vehicles and to process complaints and observations compiled by other sections. Advanced ana-

lytical equipment was purchased, enabling the section to use the most modern methods available to investigate the production of automotive pollutants.

This year, the section extended its service to the public by introducing an investigation service into complaints about the leakage of exhaust gases into motor vehicle passenger compartments through the use of a portable carbon monoxide analyzer.

Phytotoxicology

The Phytotoxicology Section is responsible for determining the degree and extent of air pollution injury to all types of vegetation throughout Ontario. The section pursues its objectives by investigating complaints concerning suspected air pollution injury to vegetation, by conducting ecological surveillance studies in the vicinity of existing and proposed sources of air pollution, and by carrying out practical research studies.

In the section's analytical facilities, vegetation samples are examined by pathological and histological techniques, and processed for chemical analysis. A herbarium is maintained to demonstrate, compare, and diagnose plant material damaged by particular air pollutants. Certain plant species and varieties sensitive to air pollutants are raised in a filtered-air greenhouse under uniform culture for use in field and artificial experiments.

A total of 196 vegetation complaints were investigated in 1972/73, of which 98 were confirmed as being caused by air pollutants. These pollutants included sulphur dioxide, fluoride, ammonia, pentachlorophenol, sodium chloride, sodium sulphate, lead, nickel, cobalt, zinc, lime dust, iron oxide, and soot.

Major investigations were made in Sombra, Ontario in view of the airborne contamination emanating from sources at St. Clair, Michigan, and in southwestern Ontario, where peroxyacetyl nitrate-type injury on vegetation was discovered for the first time in Ontario.

Fifty per cent of the complaints investigated in 1972/73 were found to be attributable to causal agents other than air pollutants, including disease organisms, insects, physiological disorders, and natural causes.

For example, fallout alleged to stem from the new high chimney stack at Copper Cliff was discovered to be droppings from a heavy infestation of Birch Skeletonizer larvae feeding on the foliage of white birch trees.

In 1972/73 major ecological surveillance studies were carried out in the vicinity of fertilizer manufacturers, a hydrofluoric acid plant, a fiberglass manufacturer, nickel and copper smelters, a nickel refinery, iron concentrators, and gold producing mines. A total of 1,117 surveillance stations were visited.

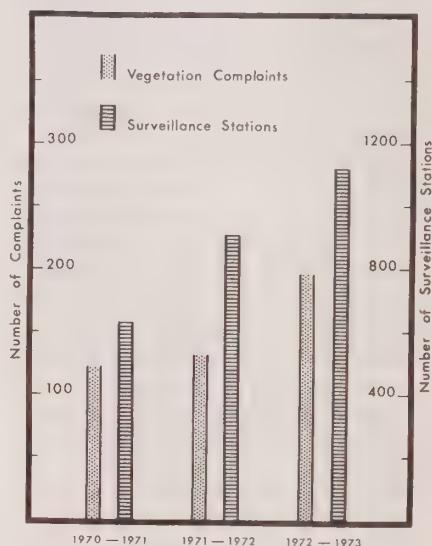
Pre-pollution baseline studies were conducted in the vicinity of new industries under construction which may be potential emitters of phytotoxic contaminants. In addition, a snow sampling program was initiated in the Sudbury area to ascertain the extent of sulphur and heavy metal washout in precipitation.

Phytotoxicology surveillance investigation reports, together with ambient air records provide a sound basis for determining the effects of industrialization and future abatement requirements.

Staff presented scientific papers at a number of technical conferences, including the annual meetings of the Air Pollution Control Association, the Canadian Phytopathological Society, the American

Phytopathological Society, and the Soil Conservation Society of America. Technical papers were written and published, and a number of invitational lectures to university students were given. Phytotoxicology staff are also active members of various national and international committees and subcommittees.

The accompanying chart illustrates the increase in complaint and surveillance investigations during the three-year period April 1, 1970 to March 31, 1973.



Special Studies

The aim of the Special Studies Group is twofold. First, the group initiates, organizes and administers the research programs under the Air Management Branch grant system to provide timely research results for air pollution problems and to assist the branch in achieving its overall objectives. Secondly, the group is in the process of developing a program of investigation in order to provide enforceable legislation to control and reduce noise in the environment.

Most of the research carried out under the branch's grant system is conducted at Ontario universities and non-profit organizations by investigators well known in their field, in order to achieve a high utilization of invested research dollars. In addition, many students are provided with an opportunity to continue their education in the environmental field.

In 1972/73 new analytical methods to monitor and identify air pollutants were successfully developed. Reactive hydrocarbons in ambient air can now be monitored on a continuous basis. Poly-chlorinated biphenyls were measured and identified in trace quantities in ambient air, and many components of diesel exhaust were identified. All this work is an important prerequisite for the design of meaningful air quality criteria and for the control of various pollutants in Ontario's air.

During the fiscal year, the group reviewed requests for grants totalling \$510,000. A total of 25 grants involving \$260,000 was issued to principal investigators from 14 participating universities and research institutions.

In addition to preparing enforceable legislation to control noise in Ontario, the Special Studies Group has been

responding to all noise complaints received by the Air Management Branch in 1972/73.

Personnel of the Abatement Section have been trained to assist the group in conducting field noise investigations. During the 1972/73 season, a total of 360 noise complaints were received by the group, of which 125 were investigated.

Two noise regulations have been drafted with the assistance of an inter-departmental noise committee. One of these, the vehicle noise regulation, is now in the final stages of preparation. A second regulation, dealing with stationary noise sources, is being drafted.

A total of \$5,800 was spent by this group to obtain and set up advanced noise equipment.

PESTICIDES CONTROL

The Pesticides Control Service continued to carry out its responsibilities as outlined under the Pesticides Act and Regulations 657. The purpose of this act is to enforce the proper use of pesticides and to avoid the misuse of these chemicals which might result in the contamination of the environment.

In addition to the Pesticides Act, which deals mainly with the application of pesticides, the Ministry has introduced other pesticide regulations, under the Environmental Protection Act 1971, which govern the sale of pesticides in the province.

A task force was appointed in 1970 by the Department of Health to study the situation of pesticides in Ontario. The task force, under the direction of the Pesticides Advisory Committee, completed its report in April 1972 and submitted it to the Ministry for implementation. New regulations which came into effect January 1, 1973 provide for the control of the sale, storage and display of pesticides. The task force classified pesticides into four classes:

Class A — consists of pesticides that have primarily high oral acute LD₅₀ and/or are persistent in the environment. This class of chemicals can only be used by a licensed exterminator or a holder of a permit issued by the service.

Class B — This class of chemicals consists of commercial pesticides used mainly by agriculturists (farmers, foresters, etc.) and commercial applicators. These pesticides are available for agricultural production and to licensed exterminators but not to the homeowners.

Class C & D — This class of pesticides is intended for domestic use such as homeowners, small gardens, and recreational areas. These pesticides are available, without a license, to anyone and can be purchased at retail vendors.

Head office for the service is still located at 1 St. Clair Avenue West, Toronto. Regional offices are located in London, Hamilton, Belleville and North Bay. District offices are located in Chatham, Clinton, Simcoe, Owen Sound and Ottawa. A new regional office will be opened in Thunder Bay on June 1, 1973.

Field Services

The field staff was responsible for the enforcement and administration of the Pesticides Act, 1967. In November 1972, the scope of our program encompassed the sale, storage, and display of pesticides. Our aim was to promote sound pesticide management — dissemination of pesticide information, licensing exterminators and vendors, co-operating with the general public and agencies involved with pesticides, and sampling programs.

During the summer of 1972, seven summer students supplemented our staff. They provided invaluable and competent assistance.

The major fraction (approximately 43%) of the 5,200 field visits made involved investigation on the misuse of pesticides. Complaints regarding spray drift, unlawful application, contamination of poisonings were investigated, and reports with conclusions were compiled.

Follow-up of licence renewals and applications as well as routine visits with

exterminators made up approximately 30% of the calls. Similarly, 30% of the calls were spent consulting and co-operating with personnel from government, county, municipal, extermination or chemical agencies.

The issuance of permits for the use of cyanogas or methyl bromide fumigations in vaults or applications for the use of hormone herbicide from an airborne machine involved 8% of the visits. In addition, the number of permits issued for use of D.D.T. for the control of tarnished plant bug on apples decreased to 67 from 225 the previous year.

Staff assisted at meetings held by agricultural technology colleges, Ontario Ministry of Agriculture and Food, municipalities, extermination firms and agricultural growers through presentations concerning the Pesticides Act Regulations. More recently, numerous speaking engagements have been held regarding the sale, storage, and display of pesticides with associations, chemical companies, dealers, agriculturalists and government personnel. In addition, many exhibits have been staffed by personnel from this section, and information distributed to all facets of the pesticide industry.

All staff attended a three-day training session in Toronto regarding the legal aspects of collecting evidence and court room procedures. Our new regulations necessitated meetings to discuss and solve problems which were being encountered. One session involved the Fire Marshall's office for a discussion on fire requirements and ratings. In addition, the staff attended and participated in pesticide symposiums and courses set up by our education section. Assistance was also given to the licensing section with regard to examination and preparation of applicants for examinations.

Our sampling programs generally originate from investigations concerning spray drift, misuse of a pesticide or accidental spillages. As a result of a fish kill, a survey was set up to check whether persons filling pesticide sprayer tanks with river water were utilizing a device to prevent back-flow of water and pesticide from the tank into the river.

An air sampling program was undertaken during the summer of 1972 at Ridgetown and the Bradford area with the co-operation of Dr. R. Frank, Director, Pesticide Residue Testing Laboratory. At the request of the Ministry of Education, an inspection survey was made of all greenhouses attached to schools. The recommendations of this survey will lead to renovations in many of the greenhouses as well as the setting up of a course on pesticide management for environmental science teachers. This program will be put on by the Ridgetown Agricultural Technology College, and we will be participating in the program.

Education and Technical

The Education and Technical Section has published four issues of "News and Views" as in the previous year. The mailing and distribution is now handled by the Information Services Branch. Requests are still coming in for subscriptions mainly from abroad.

Another publication that has received wide acceptance by senior high school students and university undergraduates is "Pesticides and the Environment". This booklet describes what a pesticide is, how it might cause contamination to the environment, and how it could affect other

forms of life if it was not controlled by government regulations. The last few pages emphasize the safe use of pesticides by applicators. Three reprints were required in 1972 to meet the demands. Circulation was over 5,000 copies.

SERVICE-IN-TRAINING COURSES

Courses for the licensed pest control operators were held in the following locations:

Toronto — A two-day symposium on methods and control of pests in gardens and ornamental trees was held at the Queen's Park Conference Room.

Guelph — A one-day course for Food Processors of the Food Industries was held at the University of Guelph. This course was supported by Heinz Co. Ltd., Libby's and Ontario Food Processors Association.

Ridgetown — The Ridgetown College of Agricultural Technology, in co-operation with this Section, held a two-day course for custom applicators in Southwestern Ontario.

Ottawa — A one-day course was held in Ottawa for the National Capital Commission employees, surrounding municipal employees, as well as the landscape and maintenance contractors, on general pest control on land.

Attendance at these courses was in excess of 2,000 people, an increase of approximately 34% from last year.

EDUCATIONAL COURSES

The following post secondary colleges in Ontario have incorporated our ten-week courses as their standard curriculum, and are issuing certificates in pesticides technology, under our supervision.

West Park Secondary School - Toronto

Humber College of Applied Arts & Technology - Rexdale

Niagara College of Applied Arts and Technology - St. Catharines and Welland campuses

Lincoln County Board of Education, Extension Education Department - St. Catharines, Ontario

Niagara Parks Commission, School of Horticulture - Niagara Falls, Ontario

St. Clair College of Applied Arts and Technology - Windsor

Ontario Training Centre, Extension of Education - Brampton

Cawthra Park Secondary School - Mississauga

Under this program, we issued 1,236 certificates in Pesticides Technology. Failures were not recorded.

The Ministry of Colleges and Universities has accepted our courses for incorporation into the curriculum of continuing education programs, and will offer this course to all colleges in Ontario during the fall and winter semesters.

CORRESPONDENCE COURSES

Enrolment in the herbicide correspondence course has declined due to the lack of staff to carry out the administrative functions. It is hoped that the course will be advertised next year and brought back to the same level of enrolment as in the past.

NEW PUBLICATIONS

This Section has published three new training manuals for structural pest control operators:

The Manual for Structural Pest Control Operators — 168 pages with full

description of insects such as the order, class and family, with full description of metamorphosis, life history, habits and picture of the insect.

Industrial Solvent Manual for Pesticides Formulations — 14 pages of technical information on solvents used in pesticides formulations. It describes the purpose of flash point, flammability, pharmacologic action and signs and symptoms of poisoning. It is meant to help the formulator to select the proper solvent for the job in question. Mathematical formulas for mixing chemicals and conversion tables are included for references.

Insecticides Recommendations Manual — 31 pages on methods and proper control of structural pests for the pest control industry. It specifically details the recommended procedure of control for each insect.

STUDY MATERIAL

The Education and Technical Section prepared and distributed 863 sets of study material for applicants who became licensed exterminators in 1972.

PESTICIDES MONITORING PROGRAM

The monitoring program for pesticides residue in water, soil, meat and milk for human consumption, which started in 1968, will be terminated in 1973. The final report will be published in 1974. The interim reports have indicated a gradual decline of residue in samples taken for chlorinated hydrocarbons since the restriction was imposed by the Government of Ontario on the use of aldrin, dieldrin, DDT, TDE, heptachlor and metabolites.

GENERAL INFORMATION

The public's demand for information on general pest control has increased in 1972 over the 1971 demands. The greatest demand for information was for the book *Black Fly and Mosquito Control*. This 18-page book outlines the procedures involved in community and individual programs for the control of black fly and mosquito. It is estimated that approximately 3000 copies were distributed to cottage associations, summer camps, and the general public. Requests for this publication were received from Alberta, Saskatchewan, and Manitoba.

Another publication that has gained national acceptance is *Toxicity and Health Aspects in the Use of Insecticides*. Because of the cost involved in the production of this book, it had to be limited to libraries, research institutions, universities, and pest control industry. This 45-page book describes the hazards involved in the improper use of pesticides.

Emergency Medical Treatment for Acute Pesticide Poisoning — This chart, which outlines the first aid and medical treatments to be followed in case of poisoning with pesticides, was reproduced with permission from the U.S. Navy Medical Corps. It was modified to meet our needs and distributed to all pesticides manufacturers, pesticides formulators, dealers, pest control operators, poison control centres, hospitals, St. John Ambulance Centres, Ministry of Transportation and Communications, medical centres, and general practitioners. Because of its technical content, distribution was limited. The greatest demand was from the Ministry of Health, Public Health Division. The distribution for 1972 was well in excess of 15,000 copies.

Licensing, Examinations and Prosecutions

The licensing program continued to develop and carry out its responsibility to ensure that certain classes of applicants of pesticides in Ontario are competent to do so with minimum effects on the natural environment and its ecosystems. Licences were issued to persons who passed an examination on the Pesticides Act and Regulations, toxicity and hazard, first aid and antidotes, methods and uses of the pesticides that the class of licence for which the applicant was applying entitled him to use. In addition, the applicants were examined regarding the identification, the life history, the habits and the characteristics of pests.

A total of 5796 licences were issued between April 1, 1972 and March 31, 1973; these include 599 operators or business, 4885 land, 209 structural, 103 assistant structural licences, an increase of 3.2% over the previous year.

The examining committee, comprised of members from Pesticides Control, Industry, and the Ministry of Agriculture, examined 831 applicants for operator's and exterminator's licences, 9.2% failed to pass the examination. In March 1973, legislation was passed requiring all pilots applying pesticides in Ontario from airborne machines to be licensed as exterminators. This change was prompted by a rise in the number of misapplications of pesticides by airborne machines. So far the examining committee have examined 21 pilots for exterminator's licences.

On January 1, 1973 new regulations made under the Environmental Protection Act pertaining to the sale of pesticides in Ontario became effective. All wholesale and retail vendors selling Class A (re-

stricted), Class B (commercial and agricultural), or Class C (home and garden pesticides), as classified by the Pesticide Advisory Committee must fulfill storage, display and licence requirements. Persons selling Class D (unrestricted pesticides) do not require a licence. There are four classes of vendor's licences. The classes vary according to the function performed by the vendor as well as the potential hazard associated with the pesticides handled and/or sold. The classes are as follows:

- Wholesale vendor's licence permits the wholesale of all four classes of pesticides.
- Class 1 retail vendor's licence permits the retail of all four classes of pesticides.
- Class 2 retail vendor's licence permits the retail of Class B, C and D pesticides.
- Class 3 retail vendor's licence permits the retail of Class C and D pesticides.

Vendor's licences issued by March 31, 1973 totalled 1,545.

As a result of the new legislation, no person may purchase A or B pesticides unless he is licensed to use those pesticides or holds a permit issued by the director or be exempt under the regulations (agriculturalists or registered custom sprayers). So far, 32 permits have been issued to beekeepers, chick hatchery operators and fur farmers to purchase listed quantities of cyanogas (Class A) in the summer of 1973. One permit was issued to purchase Picloram for weed and brush control on provincial highway rights-of-way.

Five hundred and sixty-eight custom sprayers were enrolled with Pesticides Control in 1972-73; this is a decrease from previous years. Possible explanations for this are that agricultural land is decreasing

in area, or that smaller farms tend to be absorbed by the larger ones. It is economically feasible for the larger farmer to purchase his own sprayer. (These are exempt from enrolment as custom sprayers or licensing).

Under the Pesticides Act and Regulations, eleven actions were initiated by Pesticides Control, eleven prosecutions resulted in convictions.

WASTE MANAGEMENT

The Waste Management Branch is continuing its waste management program throughout the province with a field staff of 31 located in seven offices.

As of March 31, 1973, the branch has registered 1,534 active disposal sites and 64 sites which are under closing-out process. In addition, 1,012 waste management systems were registered with the branch.

The rapid technological changes occurring in the waste management field require corresponding changes in the role of the branch. In addition to the responsibility for the inspection and certification of waste disposal sites and systems, the branch has been active in many specialized areas which include:

LEGISLATION

Regulations — Under The Environmental Protection Act 1971, the following regulations were proclaimed:

Disposable Containers for Milk — A regulation banning the use of non-returnable plastic milk containers in a size greater than one pint.

Disposable Paper Containers for Milk — A regulation which becomes effective November 1, 1973 controlling the use of plastic coated milk containers in a size greater than two quarts.

Processed Organic Waste — A regulation which controls the disposal of digested sewage sludge on land.

Deep Well Disposal — A regulation controlling the subsurface disposal of liquid wastes.

A regulation on derelict motor vehicles will expedite the provincial program for their removal and reclamation.

ENVIRONMENTAL HEARING BOARD

Under revisions to the Act, most applications for disposal sites now require a hearing before the Environmental Hearing Board to examine, in particular, the socio-economic issues relating to the site. To date, 23 hearings before the board have been held.

AREA PLANNING STUDIES

The branch provides a grant covering 50% of the cost of waste management planning studies to encourage proper planning on a county or regional basis. Studies are underway in Halton County, Oxford County, Prince Edward County, Regional Municipality of Ottawa-Carleton, and Regional Municipality of Sudbury.

The full benefits of this program will start to show in 1973 with the completion of the Hamilton-Wentworth study.

RECLAMATION

The final report of the Burlington Waste Reclamation Pilot Study was received and reviewed by the branch. The knowledge gained from this study will be used to promote other studies to examine the aspect of 'at source' separation and its value with regard to recycling.

The branch is investigating the use of municipal refuse as a fuel. It has also received approval for the concept of a pilot reclamation plant to study the problems of separation and material recovery. Funds for the design of such a plant are included in the 1973/74 budget.

It is hoped that federal and municipal

support will be obtained on this project to promote the most favorable conditions for its success.

WASTE TREATMENT FACILITIES

The branch continues to study and encourage the development of new treatment methods and facilities to deal with municipal and industrial wastes.

The City of Hamilton has commenced operation of its incinerator (SWARU) to burn ground refuse, with the recovery of ferrous metals and the production of steam for in-plant use and for sale to partly offset operating costs.

In the latter part of 1972, facilities in Hamilton and Mississauga for the thermal reduction of combustible liquid wastes commenced operation with the approval of the branch. Plans are being developed to extend these treatment facilities to other types of liquid wastes.

The branch initiated a study to examine problems of disposing of pathological waste in the Metropolitan Toronto area. The study is being done in such a way that the information can be related to other urban centres.

LITTER

An extensive educational program on litter was carried out during 1972 and will be repeated in the coming year. A litter survey was conducted in selected parts of the province during the summer of 1972 producing information which will be beneficial to the overall program for reducing and controlling litter.

DERELICT MOTOR VEHICLES

A survey to examine the aspects of abandoned automobiles was completed

in 1972. The results of this survey have been used to promote several pilot projects in 1973 and funds have been included in the budget for this purpose.

Solid Waste Task Force

The Minister announced the formation of the Solid Waste Task Force in October 1972 with representation from the public, municipalities, industry and government to examine the overall problem of solid waste. Mr. J.D. Heaman, director of the branch, has been seconded to the task force as executive officer on a full-time basis since its formation.

The objectives of the task force are to develop recommendations to the Ministry designed to produce solutions to the varied problems presented by the constantly increasing generation of solid waste. Working groups which were formed to examine the various aspects of milk and beverage containers are required to report by May 31, 1973.

Water Resources

WATER QUALITY

The Water Quality Branch is responsible for water quality assessment and providing recommendations for abatement of pollution. To meet this responsibility, the branch conducts surveys on waterways throughout the province, ranging in complexity from the development of comprehensive basin plans to simple assessments for effluent requirements to abate local pollution problems.

Staff with engineering, biology and other scientific skills conduct the surveys and prepare comprehensive reports. These reports document the location, nature, and severity of pollution and contain specific recommendations for pollution control measures necessary to restore and maintain water quality needed for water supplies, recreation and esthetics, fish and wildlife propagation and agriculture.

In support of this work, the branch maintains an inventory of existing water quality, assesses the impact of new developments to prevent the degradation of water resources and operates a laboratory unit to provide biological analysis of samples.

GREAT LAKES AND RIVER BASIN STUDIES

The 1972 Great Lakes program included continued surveillance and monitoring of water quality in the Great Lakes and interconnecting channels and environmental response studies associated with specific waste discharges and confined harbor areas.

Surveillance of mercury distribution on the St. Clair system continued in 1972. Planning for a three year intensive

investigation of pollution in the upper lakes was initiated following the signing of the Canada-U.S. agreement. Reports on intensive surveys carried out in 1970 at Thunder Bay, Jackfish Bay and Peninsula Harbor were released during the year.

SURVEILLANCE AND MONITORING

To fulfill Ministry and International Joint Commission requirements for surveillance of water quality in the Great Lakes system, the branch continued synoptic surveys in 1972. Data from this program are used in determining the seasonal, annual or longer term trends which are important in the overall management of Great Lakes water quality.

This information will also provide a basis for assessing the effectiveness of waste control programs such as the initiation of phosphorus removal. Monitoring on the heavily populated and industrialized interconnecting channels provides a measure of the progress of abatement at specific sources and indicates where further control is required to meet the international water quality objectives. Water quality information for each body of water was summarized for the first annual report of the Great Lakes Water Quality Board established under the Canada-U.S. agreement.

In carrying out the monitoring program on the interconnecting channels, the branch cooperated with the Michigan Water Resources Commission and the U.S. Environmental Protection Agency by scheduling surveys to give the broadest

time coverage to these waters. Other co-operative monitoring programs included weekly bacteriological sampling of nearshore recreational waters from Burlington to Oshawa and monitoring of the St. Lawrence and Niagara rivers as part of the Ministry's contribution to the "Materials Balance Project" of the International Field Year on the Great Lakes.

Numerous requests for water quality data and interpretation from other branches, other ministries, consultants and the public were answered during the year.

In connection with water treatment plant evaluations, phytoplankton samples were analyzed from Wellington, Thunder Bay, Brockville and Bowmanville. Weekly phytoplankton assessments at eight municipalities on lakes Erie and Ontario also continued.

Threshold odor analyses were completed on samples collected in connection with industrial waste studies at Sarnia and Bronte and a taste and odor water supply problem at Thunder Bay.

The distribution and abundance of algae in Lake Ontario was studied to provide photo-interpretive data for remote sensing techniques in assessing plant growths and a bioassay on the filamentous green algal *Cladophora* was also undertaken.

TOXICITY STUDIES

The effects of refinery wastewater on yearling rainbow trout — toxicity, growth rate and palatability of these fish — were studied through the use of continuous bio-monitoring techniques at the Bronte plant of B.P. Oil Ltd.

This work focuses on the biological significance of liquid wastes discharged by selected refining and petrochemical

industries in Ontario and is of importance in identifying future waste treatment needs for oil-based industries.

MERCURY

The mercury investigations continued in the St. Clair River system and Lower Lake Huron. As part of this work and in cooperation with the Ministry of Natural Resources the branch netted selected fish species to assess annual trends in mercury content of fish muscle.

UPPER GREAT LAKES INVESTIGATIONS

The Canada-U.S. Agreement of April 1972 included a reference for intensive investigation of pollution in the Upper Lakes to be reported on by December 31, 1975.

During the year, the branch has been developing a program of studies designed to provide the Ministry and the International Joint Commission with information on the causes and extent of water quality impairment required in the formulation of remedial and preventative water management programs. The Ministry's investigations are being integrated with those of the federal government and U.S. federal and state agencies.

HAMILTON, THUNDER BAY AND TORONTO HARBOR STUDIES

The major activity has been the evolution of near shore and harbor water quality models which have a predictive capability. These models vary in the approach and results obtained. Statistical and stochastic models are developed from routine and

intense water quality survey data (water chemistry, biological, bottom sediment and fish studies) gathered by Ministry staff or others to predict trends and evolve cause and effect relationships.

Numerical models are based upon data collected from chemical and physical recording instruments operated in the harbor entrances and at other harbor locations. These models consider existing shore geometry, discharges, intakes and lake exchanges which can then be varied to determine water quality implications of changes.

Process models examine chemical balances such as dissolved oxygen and nutrients and determine how the discharged chemical quantities are being utilized, e.g. sedimentation, biological absorption, reaction, exchange to lake, etc.

A combination of these models provides an understanding of the harbor kinetics and provides a basis to estimate the effects of changes. Significant progress has been made in model development, however, further refinement of the biological aspects is required.

The effects of thermal waste discharges continued to be monitored in the vicinity of the Nanticoke, Douglas Point and Pickering thermal generating stations.

Major drainage basin studies were carried out in the Kawartha-Trent and Lake Simcoe areas, the Thames River and in the Sudbury area. Various water quality investigations, which vary widely in intensity, purpose and scope, were carried out by staff of the Water Quality Branch.

KAWARTHÀ-TRENT WATER MANAGEMENT STUDY

The Kawartha Lakes-Trent River Water Management Program was continued. In

addition to assessing physical, chemical, biological and limnological conditions between Balsam Lake and the Bay of Quinte, branch staff completed spot surveys to evaluate the effects of waste discharges to the main stem and tributaries.

Specific objectives for each survey included an assessment of the degree and extent of effects on water quality and aquatic biota, the documentation of water-use conflicts and the delineation of proposed mixing zones.

Nutrient budgets involving a monitoring of the ingress and egress of growth stimulating elements to and from lakes of the system were completed. As well, information was gathered by means of public questionnaires on current and future water uses, to form a solid information base to guide the development of an ecologically sound water management plan.

LAKE SIMCOE STUDY

The Lake Simcoe Water Quality Study which was initiated in 1970 and intensified during 1971 and 1972 is designed to evaluate the biological, physical, chemical and bacteriological conditions of the lake. In 1971 and 1972, extensive water quality investigations were carried on throughout the open lake and intensive studies were performed in Cook, Kempenfelt and Shingle bays and other areas of the lake adjacent to major material inputs.

Clean water in Lake Simcoe is of paramount importance when one considers its size, its diverse recreational potential including excellent fishing, and its proximity to the most densely populated area of Ontario. Proper planning and management of development and activities within the basin is essential.

The report of findings of the 1970-72 water quality survey and the recommendations contained therein, are designed to lead to the formulation of a water quality management plan for the Lake Simcoe Basin. The water quality report will be published in 1973.

THAMES RIVER BASIN STUDY

The Thames River Basin Study was initiated in 1970 in response to the growing concern over existing water quality conditions and the potential further deterioration resulting from increased population growth and future economic development.

The study will lead to the development of guidelines for management of the basin's water resources to ensure that adequate quantities of water of satisfactory quality are available for the recognized uses. Erosion control and flood protection within the context of the water quality of this resource will be reviewed consistent with appropriate benefit-cost criteria.

A research program to define the quantitative relationships between nutrient and biomass was also initiated. Mathematical models are being developed to aid in the analysis of data and assessment of planning alternatives. A consultation program was also designed to obtain information from the public on the management of the basin's water resources.

During 1973, the ongoing survey programs will be completed. The findings of these studies, together with information obtained from the public consultation program will be incorporated in the final report which is scheduled for completion in December 1973.

SUDBURY LAKES

This major federal-provincial study has as its basic objectives the establishment of the cause and effect relationship between atmospheric contaminants, deteriorating water quality and declining fish populations in the Sudbury area, and how to restore acceptable water quality conditions.

In 1972, water quality investigations continued with the completion of toxicity evaluations at George Lake in Killarney Provincial Park. Considerable effort was also devoted to the development of a comprehensive study plan for proposed federal-provincial investigations. This plan includes further toxicity and water quality investigations and a pilot project to restore suitable water quality in lakes which have been acidified.

Some preliminary investigations into the toxicity of the sulphate ion to aquatic organisms undertaken in Sinclair Township are of particular significance to the Sudbury program. This work was initiated in response to the need for better information on the significance of elevated sulphate concentrations and should assist the Ministry in seeking maximum limits on sulphate in receiving waters affected by industrial inputs. Both laboratory and field studies are being considered for the 1973 season as continuations of this program.

RESTORATION AND ENHANCEMENT

In addition to dealing with the assessment and correction of specific pollution sources, the program of the Water Quality Branch has broadened to include the restoration and enhancement of waters characterized by excessive enrichment and related water use impairment, sometimes

the result of purely natural factors.

Within the general context of excessive aquatic enrichment, an ongoing study progressed in the southern end of Chemung Lake in cooperation with the Ministry of Natural Resources to determine whether extensive weed beds can be harvested as a means of enhancing water use potential without adversely affecting fish populations. Extensive vegetation removal is planned for the summer of 1973.

As a precursor to this work, a study of the relationships between aquatic plant growths and fish production in ponds north of Metropolitan Toronto has been carried out to provide direction for the larger removal program and to clarify sound pond management principles.

Other lake restoration projects included an evaluation of destratification of Buchanan Lake near Dorset to improve the ecology for deep-water species of fish, as well as aeration of Thompson Lake, north of Maple, and the Valens Reservoir, south of Guelph, to improve water quality.

An improved habitat for fish was produced in Buchanan Lake, although increased algal densities were promoted. In the Valens Reservoir, water quality improvements in terms of lake chemistry were noted.

Studies were carried out in Gravenhurst Bay of the Muskoka Lakes system and in Little Otter Lake, near Parry Sound, to assess the effectiveness of phosphorus removal in halting and/or reversing the process of eutrophication. Recognizing the limitations of a single year's data, it is encouraging that water quality improvements materialized in both systems, based on both chemical and biological responses.

In the Bay of Quinte, a cooperative venture involving staff of the Ministry of

Natural Resources and the Canada Centre for Inland Waters was initiated to assess current water quality conditions in light of future changes which hopefully will materialize following phosphorus removal at local sewage treatment plants.

An offshoot of the branch's activities related to aquatic restoration is the administration of a permit system to regulate the use of aquatic nuisance control agents. Permits are issued to authorize the use of compounds for algae and aquatic plant control, control of mosquito and blackfly larvae, leech control and coarse fish eradication.

A total of 207 permits were issued to authorize the use of aquatic nuisance control agents, compared to 212 in 1971. Over 1,050 inquiries were answered concerning regulatory practices and permissible control techniques. A member of staff continued to act as an aquatic specialist on the Ontario Herbicide Committee and recommendations for aquatic plant control were prepared for inclusion in the 1972 Research Report of the Eastern Section of the Canada Weed Committee.

SURVEILLANCE AND MONITORING – INLAND STREAMS AND LAKES

The monitoring program provides information on water quality throughout the province. The information collected through this program provides a basis for establishing the seasonal annual and long-term trends in water quality, assists in the definition of waste discharge restrictions and the enforcement of pollution control.

On the average, 15 sampling runs were carried out at 650 locations on inland streams. Sampling was intensified at about 40 streams draining into Lake

Ontario as part of the Ministry contribution to the material balance project of the International Field Year on the Great Lakes (IFYGL).

As part of the recreational lakes program, contributions were made to 25 lake reports. Approximately 70 lakes have been assessed under the program to date. The greater majority of the lakes studied so far have not demonstrated significant water quality problems. Coordination of the work which has been under the Sanitary Engineering Branch was transferred to this branch at year end.

In response to an increasing awareness of and concern for problems of accelerated eutrophication in recreational lakes, individual cottagers and associations, as well as permanent shoreline residents on over 60 lakes participated in the chlorophyll *a* - Secchi disc, self-help program.

Through this program, participating cottagers or associations collect water samples to be analyzed by the Ministry. The assessment of water quality relies on a relationship between plant life suspended in water (chlorophyll *a*) and measurements of the clarity of water carried out by the sampler (Secchi disc).

A total of 17 reports were completed utilizing the data collected during 1971 and forwarded to participating individuals. The educational benefits derived from direct involvement have been significant in terms of advancing an understanding of the causes and consequences of eutrophication in lakes.

tric power transmission line crossings on water quality in addition to 45 proposals for effluent discharges were examined for compliance with the Guidelines and Criteria for Water Quality Management in Ontario.

Water quality standards for river basins are being developed and referenced for the determination of permissible waste loadings. In the process of establishing water quality standards and effluent requirements, it becomes necessary to define mixing zones in the vicinity of waste discharges.

DREDGING AND MARINE CONSTRUCTION

All aspects of marine construction including dredging, piers, landfills, canals, bridges, submerged pipelines and utility conduits, shore protection structures and marine mining are evaluated for their impact on water quality.

In 1972/73, 222 proposals were evaluated, compared to 100 in 1971/72. Recommendations are made on these projects to prevent degradation of water quality and to avoid interference with other water users. Field studies are undertaken to verify the effects of various projects and to assess compliance with recommendations.

ENVIRONMENTAL IMPACT ASSESSMENTS

Thirty-seven statements concerning the impact of various projects such as highways, reservoirs, dams, aggregate pits and elec-

WATER QUANTITY

The Water Quantity Management Branch is responsible for the inventory, assessment and management of surface and ground water resources with respect to quantity, and also for the protection of ground-water quality.

The programs are carried forward through four sections and include the collection, analysis and publication of basic hydrometric and hydrologic data, the assessment of water resources through surveys and interpretation, the development of water supplies by test-drilling and well-construction projects, the management of resource use through a water permit system, the regulation of the water-well industry, and scientific hydrologic studies.

The programs include regulatory, planning and inventory assignments. Certain activities such as the Grand River Ground Water Recharge Studies, the Thames River Basin Study, the Onakawana Task Force Study and Ground Water Pollution Protection received priority.

Prior to April 1, 1972, the branch existed as the Division of Water Resources in the Ontario Water Resources Commission. The branch has a complement of 92 and a budget of \$1.5 million.

INTERNATIONAL HYDROLOGICAL DECADE

The International Hydrological Decade, an international program designed to advance the science of hydrology and knowledge of regional and global water resources, received continuing support by the River Basin Research Section through studies in five representative basins in southern Ontario, by the Hydrologic Data

Section through resource assessment, and by participation in various committees and seminars.

The International Field Year, a special one-year study of Lake Ontario, was in progress and was supported by the River Basin Research Section with respect to ground-water input to the lake and ground truth for several remote sensing projects. Representatives worked on the Steering Committee for the IFYGL, the Canadian Project Management Team, the Terrestrial Water Balance Panel and several subordinate groups.

NORTHERN ONTARIO WATER RESOURCES STUDIES

The Northern Ontario Water Resources Studies comprise a preliminary assessment of the water resources in the river basins flowing to James and Hudson bays. The Hydrologic Data and Surveys and Projects Sections integrated their data collection and interpretive work with co-operating federal and provincial agencies.

Administrative liaison was ensured through the Federal-Provincial Co-ordinating Committee on Northern Ontario Water Resources Studies.

CARTOGRAPHY

The Cartography Unit supported most programs of the branch and completed 41 large multicolor and monochrome maps, 132 small maps and illustrations and plotted the location of 1,347 sources of water for which permits had been issued.

DATA PROCESSING ACTIVITIES

Effective development of scientific computer programs and data processing systems to meet the needs of the branch and its sections continued to be achieved through the co-ordinating efforts of a branch liaison engineer working closely with Administrative Services.

SPECIAL ACTIVITIES

The branch provided leadership in a number of co-ordinating roles.

The Grand River Implementation and Co-ordinating Committees were established in May to consider and coordinate implementation of the Grand River Planning Report. Representatives of the Ministries of the Environment and Natural Resources, the Management Board of Cabinet, and the Grand River Conservation Authority serve on the committees. They met six times and established several task forces and subcommittees to assist in coordinating work in the basin. One meeting between members of the Implementation Committee and local municipal and conservation authority representatives was held in July.

The branch had members on the Steering Committee and Joint Management Team for the International Field Year for the Great Lakes, and the International Reference Group on Great Lakes Pollution from Land Use Activities for the International Joint Commission on Boundary Waters.

Members of the branch led a hydrogeology field trip for the 24th International Geological Congress, and a cartographic facilities tour for the Sixth International Cartographic Association Conference. Papers were presented at the

Congress, the Annual Conference of the American Water Resources Association, the Canadian Section Meeting of the American Water Works Association, the Industrial Wastes Conference, a Symposium of the International Association of Hydraulic Research, and the International Symposium on the Role of Snow and Ice in Hydrology.

Surveys and Projects

The Surveys and Projects Section conducts municipal groundwater surveys, municipal test drilling and well construction projects, drainage basin surveys, and investigations on ground-water pollution and special water supply problems.

While the demand for project support slackened somewhat, the closer liaison with the Waste Management Branch brought an increase in the number and intensity of pre-approval evaluations of proposed disposal sites. In the area of basin or regional studies, Ministry priorities required re-direction of efforts towards studies associated with the Thames, Grand and Onakawana.

NORTHERN ONTARIO WATER RESOURCES STUDY

The field and interpretive work continued on the study of the quantitative and qualitative aspects of the water resources of northern Ontario which is designed to lead to publication of a preliminary assessment report in 1974.

Test drilling to evaluate ground-water conditions was carried out in the vicinity of Fort Albany, Moosonee, Nakina and Onakawana. Representative samples

of surface waters for chemical and biological examination were obtained for the entire area, and ground-water samples were collected along the roads from Hornepayne to Nakina.

It is an objective of the study to develop an understanding of the hydrologic processes of the area and sufficient basic data so that resource data can be synthesized for all locations. Progress was made in development of a simple predictive model utilizing precipitation and short-term streamflow records. Testing of the model is required.

GRAND RIVER RECHARGE STUDY

A feasibility study was initiated into the physical, technical and economic opportunities for utilizing artificial recharge of ground water as a means of providing a source of municipal water supply for the Kitchener-Waterloo area.

The first step was to identify areas with physical characteristics suitable for recharge operations. Terra-Scan Ltd., soil consultants, was engaged to conduct reconnaissance exploration and identified several areas for detailed study. Co-ordination of this work and of a broader resource development study was a function of the section and branch respectively.

DRAINAGE BASIN SURVEYS

To meet commitments for water resource studies in the Grand and Thames Basins, the Drainage Basin program was modified and integrated more closely with the work of the Water Quality Branch. The report entitled 'Water Resources of the Upper Nottawasaga Drainage Basin' was released in May 1972. A report on 'Water Resources of the Moira River

Drainage Basin' was being finalized and was scheduled for printing by June 1973. Work on the Duffin Creek basin was reduced.

Resource assessment for the Thames River Basin was substantially completed the work of other branches towards the development of an integrated water management plan by December 1973.

REGIONAL STUDIES

In support of water and sewage works planning reports being coordinated by the Sanitary Engineering Branch, the study of ground and surface-water availability in the Counties of Halton and Peel was advanced.

MUNICIPAL GROUND WATER SURVEYS

Twenty-two surveys were undertaken by the section to evaluate ground-water conditions for municipal supply purposes. Fifteen advisory reports were released and seven studies were in progress. Nine of the completed surveys were for proposed Ministry water works programs. Test drilling was recommended for all nine at a total estimated cost of \$142,000.

TEST DRILLING AND WELL CONSTRUCTION PROJECTS

The Section participated in seven test-drilling projects, four well-construction projects and two combined test drilling-well construction projects. Six projects were carried forward from the previous year and work was in progress to initiate three test drilling and two well construction projects in 1973. The estimated price of approved and pending contracts amounted to \$342,000.

Test-drilling projects resulted in the location of suitable water supplies at Ayr, Frankford, L'Orignal, Melbourne, Wasaga Beach and Winchester. Production wells were constructed at Caledon East, L'Orignal (2), Melbourne, Sunderland and Winchester (2).

GROUND WATER QUALITY PROTECTION

Two hundred and twenty investigations into existing or potential ground-water pollution problems were completed or in progress. One hundred and fifty-one reports were released and 69 investigations were in progress at the end of the period. Thirty-two of the investigations were associated with sanitary landfill sites, 70 dealt with hydrocarbon spills and leaks, and several with significant industrial or transportation accidents.

The reports contain advice on the potential for pollution, the nature and movement of pollutants, remedial or preventative measures or prospects for alternative water supplies.

SPECIAL WATER SUPPLY INVESTIGATIONS

Sixty-six investigations into water supply problems and well performance were in progress or completed. Fifty-nine reports were released. Twenty-eight of the investigations involved the testing of project wells to determine changes in production potential.

Nineteen well inspections were conducted and 48 consulting engineers' reports for proposed provincial and municipal Ministry projects were reviewed.

Water Well Management

The water-quantity management program controls the taking of water to promote efficient development, beneficial use and equitable sharing of the available supply. This is done through a permit system involving regulation of takings and investigation of interference complaints. Associated water-use, basin planning and environmental impact studies are carried out.

APPLICATIONS AND PERMITS

Four hundred and eighty nine Permits To Take Water were issued for the following purposes: irrigation — 238; industrial — 129; municipal — 56; recreational — 45; and commercial — 21. Fifty-seven permits were amended, 266 were cancelled and 654 were renewed. In addition, 34 Letters of Approval were issued to authorize test pumping. The permits were grouped by source as follows: surface water — 367; ground water — 99; combined — 13. At the end of March, 1973, 5093 permits were in effect, authorizing a maximum total taking of 12.8 billion gallons per day.

Ten detailed pre-permit investigations were carried out to evaluate the potential of the proposed taking to interference with other uses, so that appropriate terms and conditions could be applied.

PLANNING STUDIES

Preliminary data collection for the section's contribution to the Thames River Basin study was completed, and a detailed assessment of water takings and

water-use conflicts was initiated. In addition, staff participated in the development of a public consultation program designed to obtain the views of the local residents and municipal officials. A staff member acted as coordinator of the branch contribution to the overall study.

Seven other water-use studies and two basin management studies were completed.

Data concerning water takings authorized by permit were compiled on a watershed basis for twenty watersheds.

Work was completed on the development of STORET location codes for streams in southern Ontario. Stream codes for selected areas were provided to the Ministry of Transportation and Communications for its Geocode project.

Staff carried out, or contributed to, 28 environmental impact evaluations. This involved reviews of proposed pits and quarries, roads, reservoirs, development plans, and power projects.

INTERFERENCE INVESTIGATIONS

Fifty-two ground-water and 13 surface-water interference problems were investigated and appropriate action taken. The problems can be grouped according to cause as follows: pit or quarry operation — 21; road, ditch, sewer or watermain installation — 16; municipal takings — 11; improper operation of recreational dams — 6; irrigation takings — 5; miscellaneous — 6. Three major reports were released. One concerned anticipated well and streamflow-interference due to municipal-well operation in the Township of Wilmot, and the other two dealt with well-interference problems caused by quarry dewatering in the Townships of Anderdon and Walpole.

WELL CONSTRUCTION MANAGEMENT

Water-well contractors and well-construction practices are regulated to ensure the installation of safe water wells and to protect groundwater quality. Eighty-seven licences for 1972 and 331 licences for 1973 were issued to water-well contractors. Records for 11,503 wells were received. The inspectors visited well contractors on 1,109 occasions, inspected 1,612 wells for sanitary construction, and checked the location of 10,811 wells. Twenty-eight investigations were made concerning water-well regulations.

Hydrologic Data

The activities of the Hydrologic Data Section are centered around the collection, analysis and publication of hydrometric data for Ministry and public purposes. While the provision of data is designed to serve general purposes, priorities were given to meeting the data requirements for the Northern Ontario Water Resources Studies, the Ground Water Assessment and Surface Water Assessment studies for the IHD, the Thames Basin Study, and Kawartha Lakes Eutrophication Study.

SURFACE WATER DATA

Basic streamflow data are collected through the installation and operation of gauging station networks and measurement of flows at other locations. A reduction was made in the number of gauging stations operated by the branch to permit improvement of record collec-

tion at the remaining stations. The network was reduced by 27 to 98 and summer measurements were made at 48 other sites. The number of stations operated by the Water Survey of Canada under a cost-sharing arrangement was increased by 12 to 94, including five lake level gauges.

The diverse and increasing number of requests for data from internal and public sources necessitated a review of data availability and processing. A task force worked on standard analytical procedures for conversion of basic data to the more frequently requested forms generally involving probability and extreme flow values.

Production of flow data by mathematical methods for locations where data are not available was under review. These studies are closely related to an appraisal of the adequacy of the network for selected areas in southern Ontario in terms of the reliability of measured and synthesized data to meet planning and management needs.

The basic streamflow data for 1971 was compiled and published and data for 1972 was prepared for publication. A map showing the characteristics of streamflow for stations in the Toronto Centred Region has been prepared for publication.

The section responded to many requests for data on the water levels in the Great Lakes using information provided by federal agencies.

GROUND WATER DATA

Hydrogeologic data were collected through the operation of a network of observation wells and the assembly of water-well records for new wells. The number of observation wells was increased by eight to 237. About 13,400

water-well records were received and placed on open file.

With the completion of conversion of the well record file to a computer format, flexibility in the retrieval and publication of data was achieved. Water Resource Bulletin 2-9 containing data from the water-well records for northern Ontario for the years 1946 to 1969 was published. Long-term consolidation of data for other areas in bulletin form was in progress and much use was made of computer print-outs of data on a county basis.

A Ground Water Probability Map of the County of Elgin was published. It is the fourth in a series and provides in simple terms the ground water conditions and prospects for well development. Similar mapping for the County of Haldimand was well advanced for publication in 1973.

About 250 visitors consulted the water well record files. Comments on ground-water availability were given to the public through 137 letters and some 1,100 telephone calls.

In support of the IHD — Ground Water Assessment program, the hydrogeologic properties of the overburden and the limestones of the Detroit River Group were tested and evaluated for a site in the Township of Morris.

River Basin Research

The activities of the River Basin Research Section were largely concentrated on scientific hydrologic studies including model formulation for five representative drainage basins in southern Ontario and ground-water inflow to Lake Ontario.

These studies comprise a substantial

portion of the Ministry's contribution to the International Hydrological Decade program as well as serving internal needs. Other specialized work included ground geophysical surveys, geophysical well logging, soil analyses and remote sensing studies.

REPRESENTATIVE BASIN STUDIES

The collection and analyses of data and studies of hydrologic and hydrogeologic processes were continued in five drainage basins representative of major physiographic and geomorphologic regions in southern Ontario. In support of these studies, detailed ground-water sampling and chemical analyses programs were undertaken to aid in the delineation of flow systems, and the extent and characteristics of subsurface aquifers were examined. The development of mathematical models was commenced to describe the complex interaction of the physical processes involved.

In three of the basins, analyses of meteorologic data were undertaken in preparation for the release of statistical reports. The section was host to a sub-committee of the Canadian National Committee for the IHD and to some staff and students of the Faculty of Forestry, University of Toronto, during field trips in one basin.

In two of the basins, soil moisture and snow surveys were again carried out seasonally. In the Bowmanville, Soper and Wilmot Creeks basin, gravimetric soil sampling and snowpack measurements were co-ordinated with gamma attenuation overflights carried out by federal agencies as part of a co-operative project to assess new remote sensing methodology.

Using background data from the representative basins, two papers were prepared. One entitled 'Basin-Wide Water Equivalent Estimation from Snowpack Depth Measurements' was presented at the IHD-UNESCO-WMO/IASH Symposium on the Role of Snow and Ice in Hydrology, held in Banff, Alberta. The other paper entitled 'An Approach to Mathematical Modelling of Ministry of the Environment IHD Representative Basins' was released as a Ministry publication.

GEOPHYSICAL INVESTIGATIONS

Geophysical studies were carried out in fifteen areas of the province. The majority of these studies assisted geological field investigations and projects being undertaken by other sections in the branch. A seminar on geophysical methods was presented for branch staff.

SOILS LABORATORY STUDIES

In support of Branch programs, 395 soil samples were analyzed in the branch's soils laboratory.

INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES (IFYGL)

Hydrogeologic studies were continued in seven representative areas in the Lake Ontario drainage basin to determine the ground-water inflow to the lake, a project forming a large part of the Ministry's contribution to the IFYGL program. Active field work in this program terminated March 31, 1973. An Overburden Well Yields Map of the Lake Ontario Basin was prepared and approved for release.

REMOTE SENSING

Under the IFYGL program, the branch continued to participate in remote sensing projects. Studies were carried out to determine the value to hydrology and geohydrology of the available ERTS Simulation photos and actual ERTS-A imagery.

Close liaison was maintained with the federal Atmospheric Environment Service (AES) and associates of the University of Michigan (ERIM) to assess developing techniques and requirements for adequate ground-truth information.

Staff were involved in many technical meetings concerning remote sensing and represented the Ministry on the Canada Centre for Remote Sensing (CCRS) Working Group on Hydrology. A seminar on remote sensing was presented for branch staff.

HYDROLOGIC MODELLING

As part of the branch's contribution to the Thames River Water Management Study, section staff developed and implemented a streamflow generation program for several stations on the Thames River, to provide input to the water quality model of the Water Quality Branch. Computer programming support was provided by the Systems and EDP Section.

With the publication of the conceptual report on mathematical modelling for IHD representative basins, work was commenced on a data management system, in co-operation with the Systems and EDP Section, for use with the proposed modelling studies. Basic data were used in trials with runoff-precipitation regression models for one IHD basin.

DATA PROCESSING ACTIVITIES

In co-operation with the Systems and EDP Section, design and development of the general data retrieval and plotting program were completed for the Water-Well Record System. An additional 13,500 current water-well records were coded and submitted for computer storage.

Use of computer programs in the Streamflow Data System was continued in support of branch projects. Development work was continued on programs to process analog charts, to plot hydrographs, to examine precipitation-runoff data, and on systems to handle ground-water quality and observation-well data.

The STORET stream coding system was instituted and the Branch Task Force on Streamflow Data Analysis concluded its discussions on streamflow data analyses.

Water Supply and Pollution Control

INDUSTRIAL WASTES

The Industrial Wastes Branch is responsible for regulation and control of liquid industrial wastes in Ontario as decreed under The Ontario Water Resources Act and The Environmental Protection Act.

To ensure that all industrial effluents comply with Ministry effluent objectives, branch activities include surveys of all industrial sources of wastes to the aquatic environment, assessments of the status of pollution control at each plant and recommendations on remedial measures where required.

An extensive surveillance program is maintained throughout the province, legal enforcement measures such as prosecutions and orders are conducted for gross violations, and engineering plans for waste treatment facilities are reviewed for approval. Cooperative programs are worked out with municipalities for the regulation of industrial waste discharges into municipal sewers and, a variety of specialized advisory services are available to individual companies or major industry groups to resolve pollution problems.

Special interest was placed during the past year on improving procedures for investigating public complaints, developing a spill prevention program, and responding quickly to spills of hazardous materials.

Most major industries are moving along rapidly with their abatement programs, with the exception of the pulp and paper industry. Notable progress was made in the steel industry and much attention was directed to some of the more complex problems encountered in the petroleum and allied industries.

The activities of some of the major industrial categories are highlighted below.

BASIC IRON AND STEEL

The basic iron and steel industry continued to make progress in bringing waste effluents under improved control. At Algoma Steel Corp. Ltd., in Sault Ste. Marie, a clarifier for blast furnace wastes and a cooling tower recycling system for steel furnace wastes are nearing completion. One of the major studies underway involves the acidification of blast furnace cooling water to control the discharge of cyanides.

Dominion Foundries and Steel, Ltd., Hamilton, finished construction of a filtration plant for hot-rolling mill wastes and an acid regeneration plant. A major project currently under construction is the treatment plant for cold-rolling mill wastes. These three projects deal with the wastes from the finishing works which have followed on from previous facilities dealing with effluents from the coking and steel-making operations.

The Steel Company of Canada, Ltd., started up a filtration plant to remove solids and oil from its tube plant in Welland. At the Hilton Works in Hamilton, two additional clarifiers for blast furnace wastes which are part of an overall recycling plan, a filtration plant for a new hot-rolling mill, an oil treatment plant, diversion of coke plant wastes to the municipal sanitary sewage system, and a system for the collection and disposal of batch sources of wastes are all now operational.

A major project under construction is an ion-exchange plant for control of chromium in the electrolytic tin lines, and a major study is nearing completion

for the removal of suspended solids from the finishing mills.

CHEMICAL AND PETROLEUM

A number of major pollution abatement programs in the chemical, petroleum and petrochemical industries were completed in 1972. Sun Oil Ltd. (Sarnia), Imperial Oil Enterprises Ltd. (Sarnia), Polymer Corporation Ltd., (Sarnia), Dow Chemical of Canada, Ltd., (Sarnia), Bruce Heavy Water Plant (Township of Bruce), Howards & Sons (Canada) Ltd. (Cornwall), and B.F. Goodrich Canada Ltd., (Thorold) all have pollution control facilities which should lead to significant improvements in water quality.

Regulations concerning deep well disposal of industrial wastes have been drafted and when promulgated in 1973 will result in curtailment of this method of disposal in the Sarnia area. Companies which had been relying on this type of disposal have had to develop appropriate alternatives.

Cooperation has been good and the Sarnia area refineries have established facilities to satisfactorily treat their wastes prior to discharge to the St. Clair River. These major projects were designed, installed and brought into operation in a very short time period, a fact which represents a considerable achievement for the industry.

Work continued in identifying chemical waste components contributing to fish tainting and other sub-lethal effects on fish. A major survey of Polymer Corporation Ltd. was completed in an effort to obtain quantitative data on non-biodegradable organics suspected of contributing to fish-flesh tainting.

Staff participated on the Environment Canada Task Force on Effluent Regula-

tions for the Petroleum Refining Industry. The task force is comprised of representatives from the oil industry, provincial agencies, the Environmental Protection Service, and the Fisheries Service of Environment Canada. The objective of the task force is the promulgation of national effluent regulations for the petroleum refining industry across Canada.

During the year, 36 applications for approval of treatment works were approved and these facilities, when installed, will represent a capital investment of about \$4.5 million. These figures indicate a positive approach by this segment of industry to solving its environmental problems.

A notable achievement in pollution control in the organic chemical manufacturing industry has been the development of a biological treatment system by Du Pont of Canada Ltd. at its Maitland Works for the removal of organic and nitrogenous materials from the St. Lawrence River.

The treatment system, developed by the company in cooperation with the Ministry, is expected to be fully operational in the summer of 1973 at a cost of some \$2 million to the company.

FOOD PROCESSING

Continued progress was made by the food processing industries towards correcting their waste disposal problems. Approval was given to 14 applications over the past year for improved waste treatment facilities costing approximately \$1.6 million.

The largest expenditures were for improved facilities at The Canada Starch Company Ltd. (Cardinal), Metcalfe Foods of Canada Ltd. (Deseronto), Libby, McNeill & Libby of Canada, Ltd.

(Wallaceburg), Campbell Soup Company Ltd. (Township of Blanshard), Maple Lodge Farms Ltd. (Township of Chinguacousy), and Bowes Company Ltd. (Colborne).

The problem of disposal of whey, a by-product of cheese manufacturing, has not yet been solved. Several companies, however, are actively investigating methods of processing whey to make usable food products. It is believed that solutions to the problem may be forthcoming in the near future.

MINING AND METALLURGICAL

This industrial classification includes limestone quarries, sand and gravel operations, hard rock mining and/or milling, and smelting and refining operations.

In 1972, a total of 11 certificates of approval were issued to industries in this classification for water pollution control facilities. The estimated capital and engineering costs of these works totalled \$3.7 million. These were mainly for the improvement of wastewater treatment and/or other aspects of water pollution control at existing operations.

Operations commenced at two new major mines with approved water pollution control facilities — the Mattabi Mines Ltd. copper/zinc/lead mine and mill at Sturgeon Lake, north of Ignace, and The International Nickel Co. of Canada, Ltd. nickel mine and mill at Lake Shebandowan, 40 miles northwest of Thunder Bay.

Water pollution control facilities at these locations include tailings areas designed to retain all tailings generated during the operating life of the mines, and the piping and pumping required to recycle wastewaters from the tailings

areas to the mills.

A task force, including representatives of the Ontario and other provincial governments, the federal government, and the mining industry, began discussions and studies leading to the development of national regulations for water pollution control in the mining and metallurgical industries. It is expected that these regulations will be promulgated in late 1974 or in 1975.

Two major reports were issued in 1972, which will be useful in assisting the industry to evaluate and remedy a number of its potential or actual water pollution problems. These were entitled 'The Problem of Acid Mine Drainage in the Province of Ontario — 1972', and 'Use, Characteristics and Toxicity of Mine-Mill Reagents in Ontario — 1972'.

PULP AND PAPER

During the year, a net decrease of about 38 million gallons per day in the total daily water usage of the 42 operating pulp and paper mills in Ontario was recorded. This was primarily attributable to the closure of sulphite pulping operations at the Cornwall mill of Domtar Ltd., the installation of a dry debarking system at The Great Lakes Paper Co., Ltd. in Thunder Bay and in-plant waste reductions at the Smooth Rock Falls mill of Abitibi Paper Co. Ltd.

Clarifier installations at Domtar Ltd. (Cornwall), Domtar Ltd. (Red Rock), The Great Lakes Paper Company, Ltd. (Thunder Bay), and Kimberly-Clark of Canada Ltd. (St. Catharines), were primarily responsible for a reduction of total suspended solids (bark and fibre) discharged by the industry of about 130 tons per day.

No secondary treatment facilities for the removal of BOD₅ were installed at any of the mills this year. Chemical recovery facilities being installed at the Thorold mill of The Ontario Paper Company Ltd. are expected to result in a significant reduction in BOD₅ discharge from this mill. These facilities will be in operation in the spring of 1973.

The bio-oxidation lagoon system at the new kraft mill of The Ontario-Minnesota Pulp and Paper Company Ltd. at Fort Frances experienced difficulties due to icing of the floating aerators. Modifications to the aerators have alleviated this problem and they have performed well during the winter of 1973.

Start-up difficulties have also been experienced in the mill which have resulted in waste discharges in excess of the design levels for the treatment system. Consequently, the treatment efficiency of the lagoon system has been relatively poor during this first year of operation.

Problems of airborne-foam and odors from the treatment system have also been encountered. A water spray system has been installed to alleviate these problems.

As part of the continuing program of documenting the bacteriological aspects of aerated lagoons, a second bacteriological survey of the aerated lagoon at Fort Frances and the Rainy River in the vicinity of the lagoon outfall was conducted by the Environmental Protection Service of Environment Canada, with the assistance of Ministry field personnel.

Pilot plant studies were conducted and are still being conducted to determine the applicability of various biological-oxidation waste treatment processes to particular mill wastes. Some of these studies are being conducted by the Water Pollution Control Directorate of Environ-

ment Canada at the Canada Centre for Inland Waters, Burlington, and some studies are partially funded by a grant under the Cooperative Pollution Abatement Research (CPAR) program of Environment Canada.

As a direct result of the studies into taste and odor of water and fish-flesh tainting carried out by Domtar at the Cornwall mill, a number of kraft mills are investigating the applicability of condensate stripping systems. The Ministry is encouraging the installation of these systems at each kraft mill in the province as it is believed that solutions to the above problems will represent significant progress in dealing with kraft mill effluent discharges.

Four approval certificate for waste treatment facilities were issued to pulp and paper mills during the year. The total estimated capital expenditures represented by these certificates is about \$6 million, of which approximately \$5.5 million pertains to the Domtar mills in Cornwall and Red Rock. The total value of the 52 certificates issued to the pulp and paper industry since 1965 now stands at \$35 million.

SECONDARY INDUSTRIES

This industrial classification includes tanneries, textile mills, automotive companies, metal plating and fabricating plants, rendering plants, manufacturing of building products and service industries.

From April to December 31, 1972, 17 certificates of approval were issued for treatment works and the capital expenditures involved were approximately \$4.2 million. Some of the larger projects approved were for General Motors of

Canada, Ltd. (St. Catharines), Ontario Hydro, Lennox Generating Station, East Side Plating (Windsor), RCA Ltd. (Midland), and CP Rail (Borough of Scarborough).

Most of the ready mix concrete companies in the Metropolitan Toronto area installed non-effluent treatment systems during this period.

An extensive survey was conducted of the multi-plant complex of General Motors of Canada, Ltd. in Oshawa. Pre-treatment facilities were installed by this company to improve the quality of effluent being discharged to the municipal sanitary system.

ELECTRICAL POWER GENERATION

The more important concerns with regard to the environmental consequences of electrical power generation in the province are summarized below.

Nanticoke Environmental Committee
This committee, which was formed to guide the environmental study program in the Long Point Bay area of Lake Erie, has almost finalized a report outlining the physical, chemical and biological nature of the aquatic environment in the Nanticoke area.

The studies will continue over the next several years in order to determine whether the thermal electric generating station (4000 megawatts at full power) and other industrial development (Stelco, Texaco) planned in the near future will result in any changes in that part of the Lake.

Task Force on Generation Station Siting

This task force, which was formed to ensure that adequate consideration is given to all relevant factors for generating station sites recommended by Ontario Hydro, has completed the development of evaluation criteria and has evaluated the suitability of recommended sites in two areas of the province. Terms of reference and makeup of the task force are currently being reviewed with a view to obtaining public input at an early stage in the site selection process.

Thermal Discharges

Predictions of cooling water requirements associated with the exponential expansion of the thermal electric power generation industry have created concern that thermal discharges to the Great Lakes may cause thermal pollution in the future. Existing guidelines for thermal discharges are being examined for adequacy and there is a continuing dialogue with Ontario Hydro and the Ministry of Natural Resources on the use of Great Lakes waters for once-through cooling purposes.

Task Force Onakawana

The potential environmental consequences of developing the lignite deposits in the Onakawana area in the James Bay drainage basin as an energy resource was considered by a task force which was instructed to report its findings, prior to the completion of economic feasibility studies being undertaken by Ontario Hydro, the Province of Ontario and commercial interests.

This was done in order that costs associated with protection of the environment could be given due consideration in determining the economic feasibility of the development. The report of the task force was completed at the end of 1972.

APPROVAL OF NEW TREATMENT FACILITIES

Section 42 of the Ontario Water Resources Act requires industries to submit applications to the Ministry for the approval of plans for the collection, transmission, treatment and disposal of liquid industrial wastes. Applications are reviewed and, if found satisfactory, certificates of approval are issued.

Prior to approval, a public hearing may be held under the terms of Section 43 and 44 of the OWR Act. Hearings are mandatory if the treatment works are to extend across municipal boundaries and are held on an optional basis where the Ministry considers it in the public interest to hold such a hearing.

During the 1972/73 fiscal year 102 certificates of approval were issued for individual treatment works involving estimated total expenditures of \$23.4 million. In addition, 25 other submissions were given concurrences, involving an estimated capital cost of \$9.7 million.

These latter control facilities were not subject to Section 42 of the Act as they were classed as in-plant process control measures, non-effluent systems involving wastewater re-use, or pretreatment systems with discharges to municipal sewage treatment plants.

As of March 31, 1973, 25 applications were outstanding involving an estimated projected expenditure of some \$45 million.

Since mid-1965 when the approval program was initiated, 726 certificates have been issued for industrial treatment and control works involving an estimated cost to industry of \$151 million.

In accordance with the terms of The Pollution Abatement Incentive Act, 1970, applications from industry for grants up

to the equivalent of the provincial retail sales tax on equipment installed for purposes of pollution abatement are reviewed and recommendations made to the Ministry of Consumer and Corporate Affairs. Recommendations were made in the 1972/73 fiscal year for grants totalling some \$573,000 regarding 172 applications.

PREVENTION AND CONTROL OF SPILLS OF HAZARDOUS MATERIALS

In 1972, a total of 310 spills was recorded and 287 complaints were received. Most of the complaints concerned spills rather than other forms of pollution. There was reduction of about 10% in the number of spills which occurred in 1972 compared with 1971 figures.

The loss of petroleum products was the most frequent type of spill, representing 61% of the total. Only 3% of the spills could be classed as serious and only 22% of the spills could be classed as true accidents.

The majority of the remainder could be attributed to human error, negligence and carelessness. Seventy percent of the complaints received were related to industrial water pollution problems. These calls indicate public awareness and concern for the environment. Many of the complaints (41%) concerned visible oil.

Segments of the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials were implemented on a number of spill occasions. Of these, the more significant spill incidents were: the Parker Evans/Sydney Smith ship collision on the St. Clair River in June, 1972, the oiling of approximately 3½ miles of Ipperwash Beach in June, 1972, the derailment of a TH & B Rail-

road train and resulting spillage of about 1400 tons of sulphuric acid in the Town of Pelham in December 1972, the contamination of some private wells with fuel oil resulting from acts of vandalism in the Police Village of Edin Mills in January 1973 and the explosion and resulting loss of 800 tons of sulphuric acid and about 50 tons of bunker oil to marshland adjacent to the Grand River at the ERCO Industries Ltd. plant, Port Maitland, in March 1973.

The Province of Ontario Contingency Plan is being rewritten and was expected to be completed by March 1973. In view of the impending reorganization of the Ministry, however, rewriting the plan will be held in abeyance until late 1973. It has been recommended that the revised plan be modified to outline the response for spills to air and land, as well as to water, and to broaden the scope to include some classes of moderate spills in addition to major spills.

A program has been initiated to produce a list of approved treating agents for clean-up of oil spills under special circumstances. Acceptability criteria have been published and applications have been received from a number of manufacturers for approval of their products. It is anticipated that an approved list will be published in the summer of 1973.

INDUSTRIAL POLLUTION CONTROL IN MUNICIPALITIES

A technical coordinating committee has been established to improve liaison between municipalities in Metropolitan Toronto in the regulation of industrial waste disposal to municipal sewers. A similar committee has been established to coordinate the industrial pollution control activities of municipalities con-

nected to the South Peel regional water supply and sewage system.

Generally, liaison is being maintained with municipal engineers in the regulation of industrial waste disposal in municipalities through the Municipal Engineers' Association-Ministry of the Environment Liaison Committee.

In the fall of 1972, a course was offered to municipal officials and other interested parties on the control of industrial wastes in municipalities. This is the third year for this course although it was presented in a somewhat revised format with emphasis on treatment technology and case history studies. There were 60 attendees at the course this year.

An industrial waste survey of the Town of Elmira was conducted. At the same time, close contact was maintained with Uniroyal Ltd. on the development of activated carbon pretreatment of chemical wastes being discharged to the Elmira sewage works. Activated carbon studies have also been conducted on the sewage works effluent by the Research Branch of the Ministry.

ENFORCEMENT MEASURES

This is an essential tool for forcing non-cooperative industries to embark on pollution control programs. However, the amount of work involved in the preparation of cases for prosecution in the courts and the gravity of the problems are seldom reflected by the fines levied in a successful prosecution.

Seven charges were laid against five companies under the OWR Act. Six of these prosecutions were successful and fine fines totalling \$4,000 were levied against the offending companies. One case was dismissed and a conviction on two counts is being appealed by one company.

PRIVATE WASTE AND WATER MANAGEMENT

The main objective of the Private Waste and Water Management Branch is to prevent and abate pollution and human health hazards associated with private sewage disposal and private water supply systems.

Consistent with this objective, the branch recommends against any subdivision or development of lands not served by municipal sewage systems or which are found unsuitable for on-site sewage disposal.

With the exception of the Muskoka-Parry Sound (Health Unit) district, direct responsibility for the control of private sewage systems currently rests with local Medical Officers of Health under provisions in The Public Health Act.

Although The Environmental Protection Act, 1971, under Part VII deals with these systems, that part only applies in areas which have been designated by proclamation. To date no area has been so proclaimed. Under this arrangement a major role of the branch has been one of technical advisor and consultant to the medical officers as well as to other agencies, both provincial and municipal, and to the public.

With the incorporation of the branch into the new Ministry of the Environment in April 1972, its current role and responsibilities have been under review by the government. As a result, it was recently decided that overall responsibility for the control of private waste systems will be vested in the Ministry with provision for transferring the inspection function to regional governments and to local municipalities as deemed appropriate. It was also decided that the branch should undertake research into septic tank problems.

The branch provides service through a staff of 64 permanent members supplemented by 51 full-time casual members and through six regional offices and ten district offices. It is organized into three sections — Regional Operations, Cottage Pollution Control Section and Technical Services Section.

Advice on private waste disposal and water supply to Medical Officers of Health, other agencies and the public. Review of 117 Official Plans and Amendments on behalf of the Ministry of Treasury, Economics and Inter-governmental Affairs.

Appraisal inspections of 15,000 subdivision lots and 7,200 severance lots — all new lots proposed for development in unsewered areas.

This represents about half of the total of new lots created annually in unsewered areas in Ontario. Consolidated information is not available on the number of the remaining lots inspected by Health Units.

In much of the Precambrian area, the soil cover is limited and in their natural state many lots are not suitable for on-site sewage disposal. In Muskoka-Parry Sound only about 30% of the lots inspected were suitable in their natural state, about 10% were not suitable, and about 60% were unsuitable in their natural state, but could be made satisfactory by the addition of fill.

2,907 Requests for septic tank permits were reviewed.

1,694 certificates of approval for septic tank systems installed were issued.

424 complaints were received and investigated.

The section's staff gave advice to the public in 3,700 personal and 6,600 telephone interviews.

In addition to the above services provided in Muskoka-Parry Sound, the following were also supplied from the various regional and district offices:

undertake abatement work on those systems found to be faulty.

In 1972, a total of 4,742 waste disposal systems were inspected. These were located in the Rideau Waterway corridor between Smiths Falls and Ottawa, the Thousand Islands area of the St. Lawrence River, Pigeon Lake in the Trent Waterways system and some lakes in Muskoka. Of these systems, two thirds were found to be satisfactory. However, 6% were found to be polluters, 18% were unsatisfactory, due to improper disposal of waste water and 9% were found to be seriously substandard.

A total of 1,235 cottage drinking water samples were collected. Of these, 34.6% showed presence of coliform bacteria, which are pollution indicators. It should be stressed that these are merely individual samplings indicating only the quality at the time of sampling. It is the Ministry's recommendation that all surface water supplies used for drinking purposes should be disinfected as a precautionary measure.

Abatement work was carried out to correct sewage systems found faulty or unsatisfactory. Five abatement technicians made in excess of 2,100 inspections of premises on the lakes. Also, the Ottawa-Carleton Health Unit provided assistance to the Ministry within its region by carrying out abatement work. Work was completed on 11 premises of 65 premises visited.

In addition to the Health Unit's work, a total of 886 cottage owners was notified, and 622 agreements to make the necessary corrections were obtained. A total of 275 systems was corrected, and abatement work will be continuing in 1973 to correct those not completed in 1972.

The program has good public acceptance and the cooperation received from cottagers individually and from their

Cottage Pollution Control

The Cottage Pollution Control Program was established to detect and correct faulty private sewage disposal systems of cottages located on recreational lakes. The objective of the program is to investigate about 4,000 — 4,500 premises annually and, in conjunction with the owner, to

associations has been excellent.

Technical Services

The Technical Services Section provides technical support and advice to the branch and through the Regional Operations and Cottage Pollution Control Sections to local health agencies and the public involving private sewage disposal and water supply. Major objectives of the section are to develop better methods of controlling private sewage disposal and water supply systems and to find better systems.

The section maintains a soils laboratory as an integral part of its service. During the year 240 samples of soil were received for evaluation for suitability for treating septic tank effluent, on lots proposed for subdivision and development.

Studies leading to development of alternate methods of sewage disposal continued at the Whitby Experimental Station. There are many areas of the province where either the soil is unsuitable for subsurface disposal of septic tank effluent or where there is insufficient soil cover over rock or water table. At Whitby work is under way to obtain information and a correlation between the movement of pollutants and soil types.

Radioactive and dye tracers are being used in studies carried out in the Lake Chemong area and in the Thousand Islands area of the St. Lawrence River. From both of these studies information is being obtained on the movement of wastes and contaminants originating from septic tank systems and on the treatment afforded them by passing through soils.

An important part of this work relates to the degree of fixation of phosphates in different types of soils. In this connection 'red mud', essentially a mixture of silica with oxides of aluminum and iron, is presently being tested as a phosphate removal admixture. These studies will assist in developing design criteria for effective, efficient subsurface sewage disposal systems.

SANITARY ENGINEERING

The programs of the Sanitary Engineering Branch deal with the management of water under three categories: water supply, pollution control, and the regulation of plumbing. The program responsibilities are handled by five activity-related sections and a standards development program coordinating group. The section functions are:

- the evaluation of plans of proposed water supply and wastewater treatment installations;
- a field activity program including pollution surveys and pollution complaint review, and the promotion, inspection and supervision of water and wastewater treatment plants;
- the supervision of plumbing and the control of pollution from watercraft;
- the planning of regional water supply and wastewater treatment facilities;
- the training of water and sewage works operators;

The standards development and coordinating group is concerned with the branch's water supply and wastewater treatment program.

During the year a new program was initiated to prevent pollution from ice-based sporting and recreational activities such as ice fishing and winter carnivals. A draft regulation was developed and a program of public education commenced.

Design Approvals

The section appraised engineering reports, plans and specifications submitted for the approval of water works

and sewage works in accordance with sections 41 and 42 of the Ontario Water Resources Act.

Applications and Approvals

The section processed 2,348 applications and engineering reports during the fiscal year 1972-73. These resulted in a total of 2,301 certificates of approval being issued, representing a total estimated value of \$313.3 million.

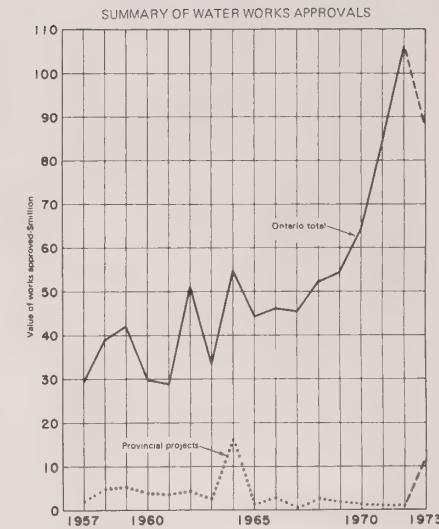
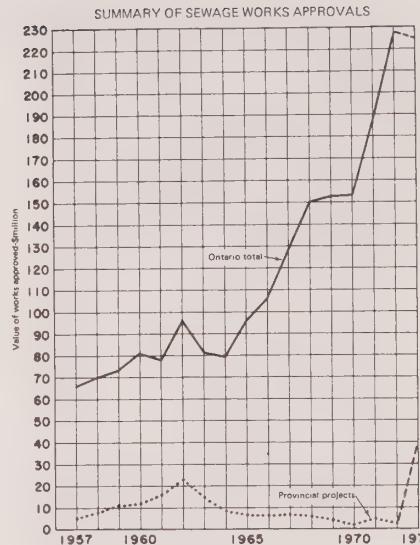
Certificates issued for water works applications totalled 981 and involved an estimated expenditure of \$88.1 million, compared with 907 certificates and an estimated expenditure of \$106.5 million in fiscal 1971-72.

In the sewage works field, 1,320 certificates were issued, at an estimated expenditure of \$225.2 million, compared with 1,342 certificates in fiscal 1971-72 at an estimated expenditure of \$206.0 million.

The accompanying graphs show the value of water and sewage works systems approved from 1957 to the end of the 1972/73 fiscal year.

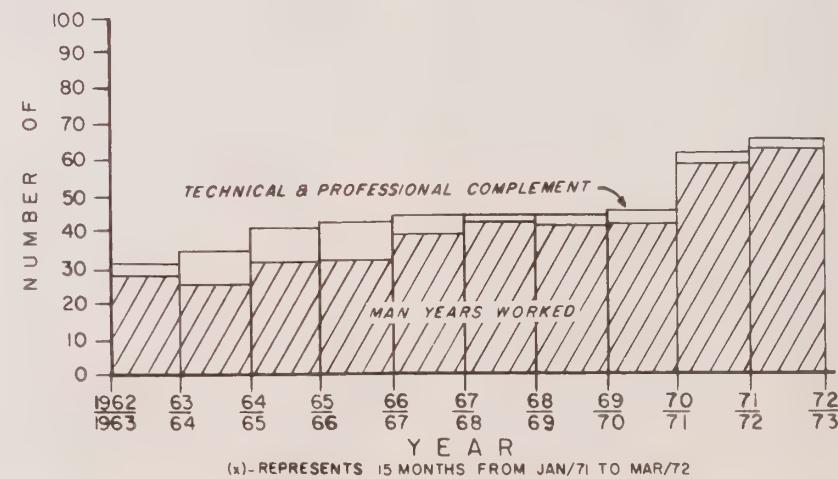
SEWAGE TREATMENT PLANT APPROVALS

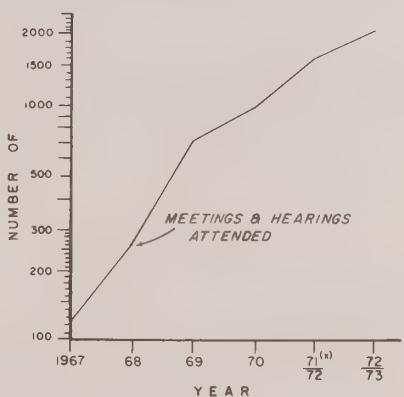
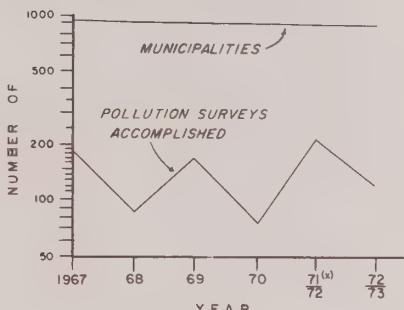
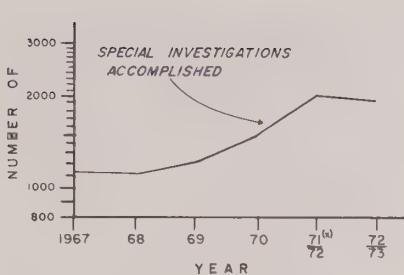
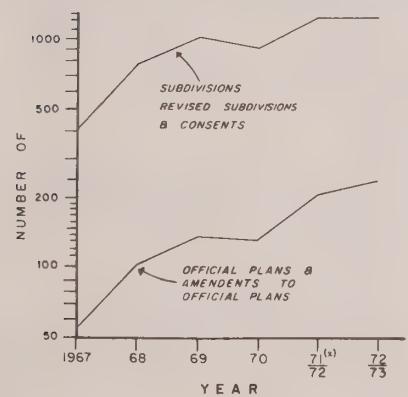
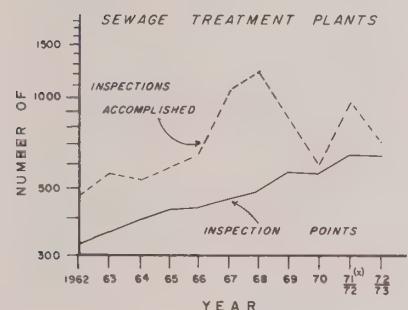
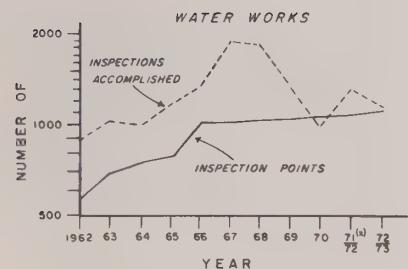
Approvals were issued for the construction of 16 new municipal sewage treatment plants and for extensions to 23 existing plants in 1972-1973.



FLUORIDATION

The section appraised engineering of all municipalities using controlled fluoridation.





POLLUTION ABATEMENT INCENTIVE ACT

function. A total of \$51.5 million was made available by CMHC for municipal projects in 1972 (calendar year), approximately \$38 million of which was allocated to municipalities within the Lower Great Lakes drainage basin.

The section continued its role of certifying the validity of claims for rebate under the Pollution Abatement Incentive Act.

Fifty claims were reviewed in 1972-73.

permission for direct disposal to watercourses and approval of sites for land disposal. In order to accomplish this, guidelines for land suitability and criteria for direct disposal were developed in conjunction with the Water Quality Branch and subsequently distributed to all municipalities in the province.

In conjunction with the Legal Branch and the Design Approvals Section, an operational policy to ensure the involvement of the respective municipality in the continued satisfactory operation of water and sewage facilities serving mobile home parks, trailer parks and recreational camp-grounds was developed and implemented.

The task force developed and obtained approval for guidelines for the provision of equipment to handle power outages at new sewage works. It is intended to bring all existing works up to these standards before 1980.

In the third year of operation of the recreational lakes water quality assessment program, three crews completed standard surveys on 24 lakes and a two-month intensive study of an undeveloped lake (Jerry Lake) in the District Municipality of Muskoka. All lakes on the Rideau and Trent-Severn Canal Systems have now been completed. The reports, which will include assessments of bacteriological, biological, chemical and physical conditions and stressing microbiological and nutrient enrichment problems are under preparation.

In conjunction with the Automated Data Processing Section, systems are being developed and information coded to permit the creation of a library of works, a plant performance evaluation, a present and future needs (planning) file and an inventory of physical descriptions of existing works. These four systems will permit better control and

data handling and manipulating procedures to be used for all water supply and sewage works in the province in the future.

A task force composed of four field staff has been assigned the responsibility of preparing white papers on procedures to be followed and equipment to be provided to enable municipalities to handle emergencies at water and sewage works. These documents will be reviewed internally and externally before they are finalized and become operating requirements of this section. This will ensure that the public is protected as much as possible with respect to drinking water contamination and that a minimum of environmental damage will result from emergencies at sewage collection and treatment works.

Plumbing and Boating

PLUMBING PROGRAM

In the Province of Ontario the installation, maintenance and repair of plumbing, with a few minor exceptions, is controlled by the provincial Plumbing Regulation. The section is responsible for ensuring that this regulation is kept up-to-date and also for providing technical liaison with municipal inspectors. The section is assisted in its function of maintaining a modern code by the Plumbing Advisory Committee made up of representatives from industry, municipal regulatory authorities and engineering and water pollution control associations.

During the year a major revision to the Plumbing Regulation was processed with provision being made for the inspection and certification (Canadian Standards Association) of plumbing in mobile homes, the prohibition of the use of toxic

materials in heat exchangers contacting potable water, and the control of the addition of inhibitors to potable water systems.

BOATING AND ICE SHELTERS PROGRAMS

Of the 2,759 pleasure boats inspected during 1972, 64% were owned by Ontario residents and the remainder were from out-of-province. Violations were noted on 101 craft bearing Ontario identification and on 140 visiting boats. Corrections were obtained on Ontario-based boats without resorting to prosecution. In most cases, it is not known if the out-of-province violators later complied, as this group is now beyond provincial control. Joint-use notices explaining the requirements were supplied to the Canada Customs port offices for distribution to non-Canadian boaters entering the province. A new Ministry form replaced the federal government E-99 Vessel Report form. Consideration is being given to sealing inadequate facilities before permitting boats to enter inland canals. This step would be taken to prevent pollution and encourage foreign boats to install approved devices.

Increased emphasis was placed on the inspection of marinas to document the methods of disposal for garbage and sewage. Two hundred and forty-seven marinas and yacht clubs were equipped to offer pump-out service in 1972. This compares to 224 during the 1971 boating season. A marina operations program to train personnel for middle management is now under way at Sheridan College's Brampton Campus. The course stresses the technicalities of pollution prevention and was developed in cooperation with an advisory committee that includes a

member of boating staff.

As requested by the Resources Development Policy Field Committee, a regulation is being drafted to control pollution from ice-oriented recreational activities. A pre-regulation surveillance program was undertaken by staff employed in the Private Waste and Water Management Branch, and the Boating Section in Sanitary Engineering.

A Ministry-sponsored meeting was held in December to discuss pollution from outboard motors and effects on the environment. On hand were outboard motor manufacturer executives from Canada and the United States.

Ministry officials noted that the marine industry had made progress in eliminating crank-case drainage condensates and that a joint Environmental Protection Agency/Industry study is well advanced to investigate thoroughly what effect, if any, marine engine exhaust discharges have on aquatic ecology.

Agreement was reached at the meeting to back measures introduced by either government or industry to reduce any harmful effects of outboard motors on water quality.

Regional Services Planning

The activities of the section continued in four general categories: preparation of preliminary engineering reports on area water supply and pollution control facilities, participation in interministerial liaison activities, evaluation of planning, development and servicing proposals, and the provision of assistance to other sections and branches of the Ministry.

HAMILTON-WENTWORTH

The Hamilton-Wentworth Water Supply and Pollution Control Study was released in draft form. The report outlines

The report outlines a servicing strategy to cope with the rapidly expanding urban areas adjacent to the City of Hamilton, in particular the areas of Ancaster Township and the Town of Dundas.

KENORA AREA

A preliminary investigation of the servicing requirements of the Kenora area was undertaken.

This included a field trip to the area and a review of the current development proposals and existing water supply and pollution control facilities in the Town of Kenora, the Township of Jaffray-Melick and the Town of Keewatin.

YORK CENTRAL-PICKERING AREA

The York Central-Pickering Area water supply and pollution control scheme was officially announced by the government in June.

Assistance was given in preparing a brief outlining the proposals to the treasurer and senior staff of the Ministry of Treasury, Economics and Intergovernmental Affairs, the Policies and Priorities Board and the Provincial Liaison Committee for Metropolitan Toronto and Regional York.

In addition, meetings were held with consultants to outline provincial development policies for the York Central and Pickering areas.

WATERLOO-SOUTH WELLINGTON AREA

The Waterloo-South Wellington Area Study was concluded with the release of the report 'Strategy for Growth' in Hespeler. Staff provided technical aid to this study and prepared a supporting brief on public services.

CENTRAL PLANNING REGION

The section continued to participate in the Regional Development Program for the Toronto Centred Region now known as the Central Planning Region. This included representation on the task force on the location of the Parkway Belt and the Liaison Committee for Central and Southwestern Ontario. This latter committee was disbanded towards the end of the year. However, until that time input was provided to the Regional Development Branch on the availability of services.

CANADA/ONTARIO — CANADA/U.S. AGREEMENT

The Canada/Ontario Agreement on Great Lakes Water Quality commits Ontario to a five-year, \$250 million capital works program to upgrade sewage collection and treatment works in the Lower Great Lakes to meet national and international commitments. This is complemented by a five-year, \$6 million Federal-Provincial Technology Development Program. Both programs conclude December 31, 1975.

In the first two years of the program \$102 million in capital works have been committed, and in the Technology

Development Program expenditures exceeded \$1.7 million. In the latter program research is being carried out by private contractors, universities and the two levels of government with major emphasis being placed on the investigation of phosphorus removal processes, advanced forms of waste treatment, sludge disposal and the treatment of storm and combined sewage.

Specific studies were initiated to assess the effects of sludge disposal on agricultural soils, their potential fertilizing value and pollutional effects with emphasis on virus transmission and heavy metals. Full-scale studies were successfully carried out on the use of waste pickle liquor from steel product manufacturing operations for phosphorus removal at municipal sewage treatment plants.

A total of 46 research projects have been undertaken, some of which are long term and will continue to the end of the agreement.

PHOSPHORUS REMOVAL

Under national and international agreements and a provincial policy for the protection of recreational waters, Ontario is committed to the provision of phosphorus removal facilities at more than 200 municipal and institutional sewage treatment plants. One hundred and fifty of these are to be operational by December 31, 1973, with the remainder becoming operational by December 31, 1975.

Under the \$6 million Technology Development Program of the Canada/Ontario Agreement, funding is made available for phosphorus removal treatability studies at individual plants. The studies are intended to optimize financial considerations through the selection of the most

appropriate chemical and the integration of treatment into existing plant processes.

Over the course of the year, 54 approvals were issued for phosphorus removal treatability studies to a value of \$1.3 million. Studies have been completed at 43 municipalities with five plants now in permanent phosphorus removal operation.

HOUSING

Towards the latter part of the year the section became involved in a series of task forces dealing with housing problems in the province. The most intensive study was undertaken by the Task Force on Housing Lots in the Metropolitan Toronto Area.

A brief was also provided for the Advisory Task Force on Housing Policies which is studying the housing field in the province as a whole. A background paper was also prepared for the Federal-Provincial Conference on Housing in January, 1973.

Training and Licensing

With an ever-increasing degree of urbanization and industrial development in the province along with the expansion of recreational activities, larger and more complex water and sewage treatment works are being installed to provide the people of Ontario with safe, potable water and to protect the waters of the province from pollution.

While satisfactory works may be installed there is a necessity to properly

operate such works if the stated objectives are to be met. This can be achieved by increasing the number of visits made by provincial inspectors, or on the other hand, by providing the operators with the required skills to correctly operate the works and also to assign the operator a legislated responsibility to ensure that the developed skills are used.

In 1971, a program was commenced to train and license operators to provide them with these necessary skills and a legislated responsibility so the assigned goals of the Ministry could be met.

While still in its developing stage, the Training and Licensing Section conducted two workshops — Activated Sludge Analyses and Interpretation, and Basic Gas Chlorination — and two courses — Introduction to Waste Treatment, and Introduction to Water Treatment — a total of 16 times during the past year.

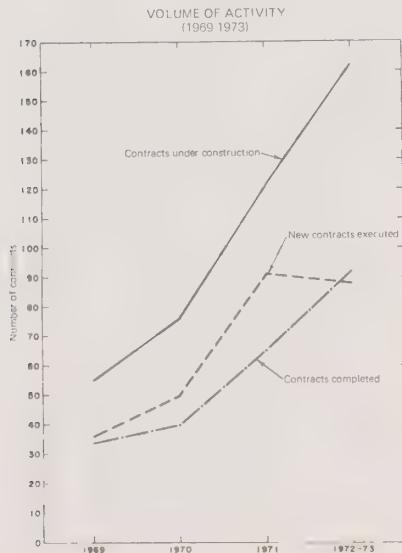
Over 500 trainees attended these sessions, which were held at the main laboratory in Toronto. The instructor staff was composed mainly of personnel from the various branches of the Ministry.

The behavioural objective approach to training (BOAT) which emphasizes 'need to know' areas was used and met with favorable comment from the participants.

PROJECT CONSTRUCTION

The Project Construction Branch is responsible for the administration of contracts let by the Ministry for the construction of waterworks and sewage works which are undertaken for municipalities, or groups of municipalities, as provincially-financed projects. This administration includes the overall supervision and coordination of the engineering services provided by consultants and of the work carried out by contractors.

Prior to construction the branch is involved, in conjunction with other branches, in the review of design reports, tender documents, drawings and specifications submitted by consultants. The purpose of this review is to ensure general technical adequacy and compliance with



Ministry standards and practices.

The branch is responsible for coordinating the review of specifications and quotation documents related to major items of equipment which are selected for inclusion in treatment plants and pumping stations prior to the calling of tenders on the general contract. This procedure allows more time to be devoted to the assessment of available equipment and gives the Ministry a greater voice in the choice of these major items.

During the course of construction, engineers make regular visits to the construction sites to inspect the quality of

work and review progress. At the same time liaison is maintained with municipal officials and representatives to exchange information and to try to minimize disruption of traffic where construction involves excavation on municipal streets and roads.

In the fiscal year 1972/73 construction of sewage works or water works was carried out in 101 different municipalities by 94 contractors, with engineering services provided by 33 consultants. Construction activity reached its peak in September when 113 contracts were under way.

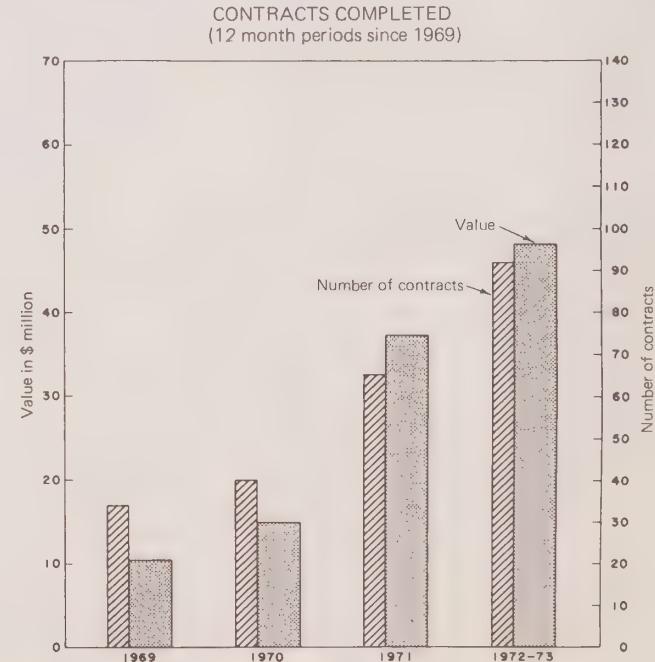
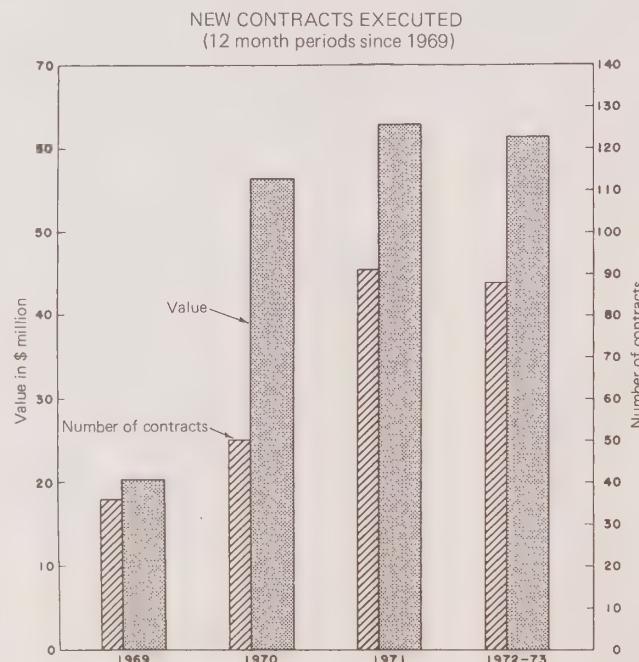
(See graphs for volume of activity compared to previous 12-month periods).

Of the \$61.44 million cost of construction contracts executed in 1972-73, about \$40.00 million was for sewage

works and the remainder for water works. It can be seen that the volume of work has increased significantly in terms of the number of separate contracts completed and the number under way during the year.

Bankruptcy of the general contractor engaged in the \$20 million extension to the Hamilton sewage treatment plant has necessitated the spending of an unusual amount of staff time in resolving problems associated with the completion of this work.

Liaison with the consulting engineers was maintained by means of meetings with the Association of Consulting Engineers. Matters which are of mutual concern and interest were discussed with a view to improving the services provided and reducing the time taken to process



approval of submissions. Matters related to fees and reimbursable expenses were also discussed.

Meetings with the Ontario General Contractors Association and the Ontario Sewer and Watermain Contractors Association were also held. These meetings proved helpful in conveying to the contractors the reasons for certain procedures which are followed in dealing with the calling of tenders and the award of contracts. Opportunities were also provided for the contractors to make suggestions which they felt would increase the number of bids received by the Ministry and which would tend to reduce prices being tendered. Particular attention was focussed on works which are undertaken in the northern regions of the Province.

The administration of The Public Works Creditors Payment Act has continued to consume a considerable amount of time. It has become increasingly clear that the lack of a provision in the Act for any tribunal to adjudicate on the validity of claims is one of its weaknesses. This was illustrated on the Dundalk and Ridgetown projects where a sub-contractor declared bankruptcy. About 150 claims were submitted under The PWCP Act including many claims from local people in respect of items other than materials supplied to or work done at the jobsite. Ruling on the validity of these claims will take time.

Construction activity summarized in the accompanying graphs includes area schemes such as South Peel, Blezard Valley and Lambton County, where the construction program will continue in 1973/74. It is anticipated that the present level of construction activity in 1973/74 will be maintained, but there may be a decrease in the number of tenders being called.

PROJECT DEVELOPMENT

The Project Development Branch is responsible for the development of water and sewage works systems which are financed by the province. Details concerning the activities of the various sections within the branch are provided later in this report.

During the year there were a number of important developments which affected the activities of the branch. Some of the highlights are summarized below.

FINANCIAL ASSISTANCE TO MUNICIPALITIES

The provincial assistance program continues to act as a stimulus to municipalities seeking the development of water and sewage programs. As a result, a majority of requests received are from the smaller municipalities with populations in the 500-1,000 range.

During the year, a considerable amount of work went into the preparation of background information in support of a request for changes in the subsidy program. At year's end, indications were that additional assistance would be provided for the high cost programs.

REGIONAL MUNICIPALITIES

A great many programs are being developed within the regional municipalities. Staff continue to maintain regular liaison with regional officials and it is expected that the number of programs will continue to increase.

GENERAL

The branch continues to receive requests for assistance in the development of water supply and sewage disposal systems for Indian communities and other areas in the unorganized townships. While there has been no change in policy in these areas, staff have participated in a task force which has examined the problem and made recommendations on a solution.

Considerable progress has been made in reducing the time involved in the development of programs though more frequent participation in meetings with municipal officials. On the other hand, opposition by ratepayers groups has resulted in lengthy delays involving a number of programs.

Provincial Projects

During the year there was a minor decrease in the number of new projects requested. However, a large number of programs have reached the point where preliminary engineering work has been completed and the workload involved becomes more extensive. A total of 22 applications for sewage works and 10 applications for water works were received. Twelve of these programs were accepted, and 43 municipalities participated in programs.

Area Projects

Staff of the branch has become in-

creasingly active in the development of water supply and sewage disposal programs for the Central York-Pickering area. Arrangements have been made to retain consulting engineers to begin the design work on the new facilities which will be constructed by the Ministry.

New studies have been undertaken in Essex County and Lambton County related to integrated water supply systems involving a number of municipalities.

Municipal Projects

The activities of the Municipal Projects Section remained at essentially the same level in 1972 as in the recent years. A total of 27 new projects were undertaken and the number of programs under development at the end of the year was somewhat greater than at the end of 1971.

Property

The number of new properties listed for acquisition (536) during the year was down only slightly from the previous year. However, the number of transactions completed, the number of options pending final agreement (547) and the number of expropriations outstanding (90) at the end of the year are all greater than at the end of 1971. The use of independent negotiators has been of considerable assistance in coping with the heavy workload involved.

PROJECT OPERATIONS

The Project Operations Branch supervises the operation of all water and sewage works financed and constructed by the Ministry. As of March 31, 1973 there were 418 projects operating in 241 municipalities and seven industries (municipal: 144 water, 209 sewage; provincial: 23 water, 42 sewage) with a total of 389 plant operators being on staff.

Figures 1-4 graphically illustrate the total field staff, the number of projects in operation, the total capital costs and the total operating costs for the period 1957 to 1972. Figure 5 indicates the distribution of operating costs during 1972-73.

ADMINISTRATION

The branch becomes involved in each new project during its design stage. Reports, plans and specifications submitted by consulting engineers are reviewed by the branch, in conjunction with other branches, to ensure the provision of adequate works. The branch is responsible for investigating and initiating enlargement of existing projects where necessary. The branch is involved in the initial settling of rates for provincial works and in the altering of these rates, when conditions warrant, within agreement terms.

For administrative purposes, the

FIG. 1 – TOTAL FIELD STAFF

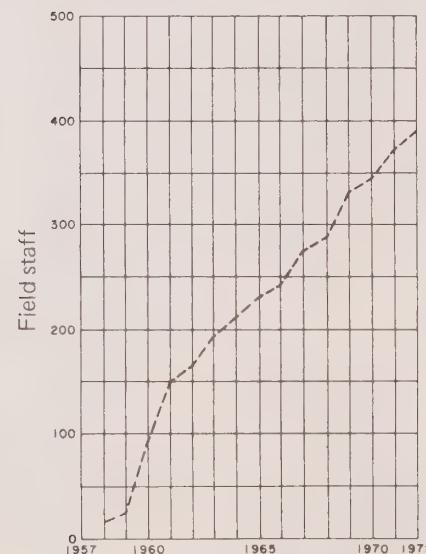
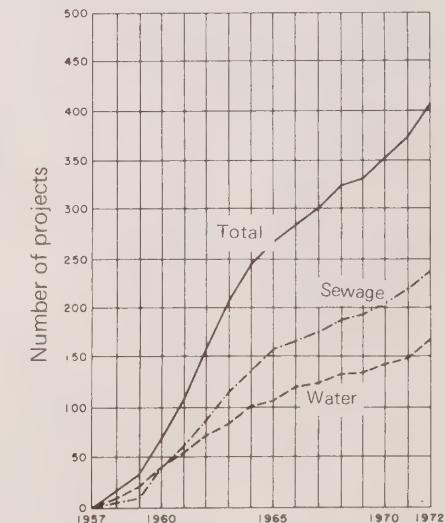


FIG. 2 – PROJECTS IN OPERATION

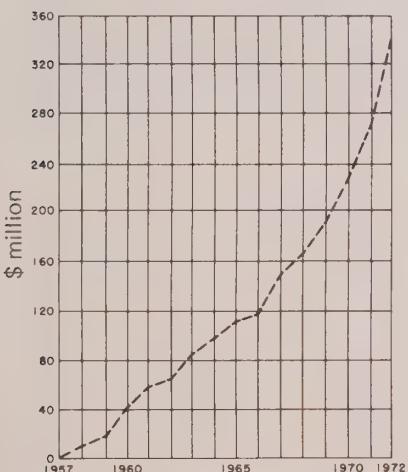


province is divided into six regions, the projects in each region being the responsibility of a regional operations engineer. Major provincial projects are the responsibility of an engineer-manager. The operations engineer and the engineer-manager report to a supervisor who participates in the development of policies established at branch level.

Four sections — Project Services, Maintenance, Safety and Utilities — contribute to the overall administration and operation of the projects.

The operations engineers and engineer-managers prepare annual estimates of project operating costs, determine staff requirements, maintain liaison with local officials, ensure maximum process efficiency and adequate preventive maintenance.

FIG. 3 — TOTAL CAPITAL COST



Project Services

The Project Services Section, including a statistics group, assists in the solution of process problems and maintains data on project operation. Under a project services engineer, the section investigates operating field problems, evaluates operating results and appraises new chemicals and processes. During 1972-73, the section assisted materially in the preliminary testing for the full scale introduction of phosphorus removal in Ministry operated projects. The section prepares and prints annual summary reports on the operation of all projects under the jurisdiction of the branch.

Maintenance

The Maintenance Section, consisting of mechanical, electrical and electronic technicians and technologists, assists the operations engineers and engineer-managers in establishing adequate maintenance and preventive maintenance programs. This ensures a high standard of project maintenance, continuity of service and protection of the Ministry's capital investment. The field coordination of the maintenance program is provided by a maintenance technician in each region reporting to the regional engineer. The reporting system embodied in the preventive maintenance program provides data for the evaluation of equipment and materials for new project construction.

Safety

The Safety Section, consisting of two safety officers, makes routine inspec-

tions of all projects, looking into the safety aspects of the operation and ensuring that safety regulations are being followed. The section investigates lost time accidents and arranges operator training courses in first aid, fire protection and the use of safety equipment. The section maintains close liaison with the Energy Branch of the Ministry of Consumer and Commercial Affairs and the Industrial and Construction Safety Branches of the Ministry of Labour in the development of safety standards for operating projects. There were no fatalities or permanent injuries suffered during 1972-73 by the branch's operating personnel. Disabling injury frequency totalled 22.6 injuries per million man hours and severity rate for the period was 272 man days per million man hours.

FIG. 5 — DISTRIBUTION OF OPERATING COSTS

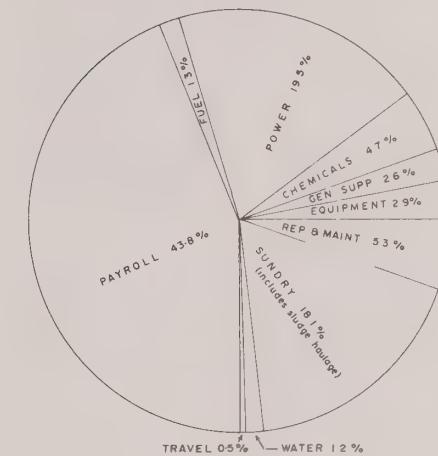
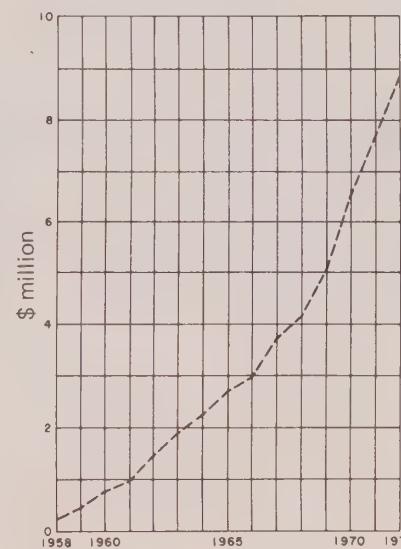


FIG. 4 — TOTAL OPERATING COST



Utilities

This section was created as a result of the reorganization of the provincial government on April 1, 1972 and is responsible for the day to day operation of all projects financed, constructed and operated by the Ministry; under this reorganization all field staff at the projects assume the status of civil servants on April 1, 1973 as opposed to Crown employees. The section also operates, under suitable general agreements several municipally owned sewage and water treatment plants.

Management and Operations Support Services

PESTICIDES ADVISORY COMMITTEE

The membership of this committee was expanded on April 28, 1972 by the addition of Dr. C. Ronald Harris and Dr. Ernest Mastromatteo. There are presently thirteen members plus the Chairman, Mr. K.G. Laver.

The committee held 21 full meetings to consider a wide range of topics, and completed several major objectives during this year:

- The classification of all registered pesticide products
- A report on the Use of Minimum Dosages of Pesticides
- Bulk Storage of Pesticides report
- A report on the Waste Disposal of Pesticides and their Containers
- A report on the Status of the Potato Stem Borer in Ontario
- Heptachlor vs. Chlordane report
- Advised the Ministry on legislation regarding the adoption of the committee's report in the Environmental Protection Act
- Worked with Workmen's Compensation Board to create a storage sign and advised on general safety
- Reviewed DDT in Ontario in respect to its continuing agricultural use
- Reviewed the relationships of Ontario and federal legislation regarding pesticides and reported to the Ministry
- Studied new Nova Scotia restrictions and reported to the Ministry

The above reports were the work of various sub-committees which met an additional twenty-seven days in order to present information to the full com-

mittee. Several of these sub-committees are still operating and will be studying:

- Classification of new pesticide products
 - Updating classification of active pesticide ingredients
 - Permitted use of DDT and proposed structural reregistration
 - Legislation
 - Ethylenethiourea (ETU) as a contaminant of some pesticides
 - An inventory of pesticide research in Ontario
 - Alternates to chemical pest control and their present status
- The committee has recently been given two new areas of responsibility:
- It will recommend research projects regarding pest control to the Ministry for funding (now in the process of obtaining tenders from research facilities in this regard); and
 - The committee is to review all pesticide publications of the various ministries of the Ontario Government.

The chairman and other members of the committee sit on various federal and provincial committees which are concerned with pesticide use and problems and endeavour to work closely with these committees, universities and industry to keep the Ministry informed on all matters concerning pesticides and their use in Ontario.

PESTICIDES LICENCE REVIEW BOARD

During the past fiscal year, the Pesticides Licence Review Board met twice and considered two appeals; one by Mr. Clarence Hunter and the other by Mr. Joseph Izzotti. As a result of these appeals, several recommendations were made to the Ministry regarding examinations, procedures, and regulations.

On January 24th, 1973, Mr. I.W. Pasternak, Q.C., replaced the Chairman, Mr. Carl W. Caskey, Q.C. because of Mr. Caskey's illness.

At the beginning of the fiscal year, Mr. D.W. Wilson replaced Mr. D.L. Bogaerts as Executive Secretary, as a result of Mr. Bogaerts' death.

INFORMATION SERVICES

Information Services provides a wide range of public information and educational services designed to communicate the Ministry's commitment to the preservation and improvement of the environment. These services are divided into sections concerned with editorial, education and information, and audio/visual functions. The fiscal year 1972/73 saw a further expansion of the branch, and a commensurate enlarging of programs.

Editorial

Editorial staff produced 125 folders, brochures, copies of regulations, student papers and related pieces of material during the fiscal year. Of this total, 43 publications were new titles, 40 were updated and revised reprints of previously-produced material, and 42 comprised such items as decals, bookmarks, posters, and similar promotional material. A grand total of over 900,000 pieces of literature was distributed to the general public.

In May, the bi-monthly tabloid *Legacy* replaced the former OWRC publication *Watertalk*. *Legacy* has a circulation of approximately 15,000, and is distributed to schools, universities, libraries and the general public.

Quarterly, the Ministry's internal publication, is distributed to all staff members, and has a circulation of 2,500.

In the same fiscal period staff produced 125 news releases, and an environmental column was prepared and made available at no charge to the province's weekly newspapers.

Of the total number of releases 70 were concerned with water pollution control and water systems, 23 were on air management, 22 on land pollution, and 10 on general Ministry activities (meetings, personnel changes, etc.)

Education and Information

The special projects section of the branch maintained an active schedule of exhibits at major fairs and exhibitions during the fiscal year.

Participation included the Central Canada Exhibition, the Pollution Control Show, the Royal Agricultural Winter Fair, the Canadian International Boat Show and the International Plowing Match. The Ministry also exhibited at the Mayors' and Reeves' Conferences, the Canadian Educational Showplace and the Ontario Science Center. In all, 27 fairs and exhibitions were included in the Ministry's schedule.

An added activity of special projects was the organization of official water and pollution control plant openings. Seven of these ceremonies were held, including that of the extensive Elgin Area Water System.

Speaking engagements were accepted by branch personnel in greater numbers than the 1971/72 fiscal year. Staff members appeared at 58 functions, giving talks on the Ministry's activities, often with slide show or motion picture back-up. Total audience

contact is estimated at 12,000.

The educational resources coordinator accepted an additional 54 engagements to speak before school groups, service clubs, and assorted civic bodies. This represented a total direct contact audience of approximately 11,000.

A successful communications venture by Humber College students working in the branch under the SWEEP program (Students Working in an Environmental Enhancement Program) was *Ecologee*, a travelling puppet show designed for four to ten year-old children. The show, featuring skits, playlets and songs based on environmental themes, visited day camps, parks and playgrounds throughout the province during the summer months. The estimated total audience of *Ecologee* was 75,000.

The educational resources program meets the need for consultation and coordination between the educational system in the province (both formal and informal) and the Ministry of the Environment. In the fiscal year 1972/73, the environmental education program was broadened and developed, based on a careful examination of the needs for educational resources that will assist teachers, students, environmental organizations and the general public. The educational resources coordinator maintained liaison with many environmental organizations, and made presentations both on a formal and informal basis throughout the province to universities, community colleges, secondary and elementary schools, at professional development days, conferences, rallies, and to several service organizations. Additionally, the continuous development of teacher aids and resource material aimed at specific age groups continued, of which

the student and teacher Enviropaks formed an important part.

A highlight of the year was the second annual Straight Goods youth conference, held at Queen's University in Kingston. Sponsored jointly by the host university and the Ministry, the conference brings together environmental specialists and secondary students in as open a forum as possible for dialogue and discussion of environmental topics. Straight Goods III is planned to be held at the University of Western Ontario in late summer of 1973.

Audio Visual

The audio visual section's activities increased considerably over the previous fiscal year. The production of a 25-minute color film on the Ministry was completed in late March. This feature took nine months to bring to completion. A total of 10,000 feet of 16 mm film was exposed for the production of this feature, portions of which will also be used for future short films and public service announcements to be released in the spring of 1973.

When the Ministry of the Environment was formed, the audio-visual section absorbed the photographic files of the Ontario Water Resources Commission, and considerable time was spent in collating and filing a combined total of 10,000 color slides and black and white negatives.

During the fiscal year, branch staff handled a total of 51,812 telephone requests, assorted mail inquiries, and personal visits.

An extensive advertising program was directed strongly to the litter problem. It included a poster campaign, newspaper advertisements, and television spot announcements.

LEGAL SERVICES

The branch provides a wide range of legal services to support the implementation of the policies and programs of the Ministry. These included the prosecution in the courts of companies and individuals for violations under The Environmental Protection Act, The Ontario Water Resources Act and The Pesticides Act.

In addition, the branch provides legal advice to the operating branches, prepares Orders-in-Council, regulations, contracts and orders.

During the year the staff of the branch were brought together under a new director in offices at 135 St. Clair West.

As of April 1, 1973, all lawyers in the branch and their secretaries were transferred to the staff of the Ministry of the Attorney General as part of an amalgamation and coordination of legal services throughout government. This transfer, however, did not involve any change in reporting relationship.

PERSONNEL

The 1972/73 recruitment program provided 251 new staff members for full-time positions. In addition a number of career-minded students were given the opportunity to gain experience in various Ministry programs, including the SWEEP program.

A major program involving organization, position administration, and job evaluation commenced and is continuing throughout the Ministry.

A memorandum of understanding concerning employees in the Project Operations Branch was negotiated and ratified with the Civil Service Association of Ontario to cover a contract period from July 1, 1972 to June 30, 1973.

The staff development program included Ministry training courses, Civil Service Commission courses and courses provided by outside agencies. A number of requests were approved for staff members to receive financial assistance for educational purposes.

The branch investigated problems involving personnel, counselled employees, and provided advice and assistance to supervisors and senior management. The branch acted as liaison with the Civil Service Commission and the Civil Service Association of Ontario in personnel matters.

The total complement for the Ministry on March 31, 1973 was 1692.

STRATEGIC PLANNING

Strategic Planning was created in April, 1972 during the reorganization and integration process which established the Ministry of the Environment.

The branch was formed to fill a basic need for a coordinated approach to environmental planning. Its purpose is to act in a coordinative and consultative capacity in three areas: environmental planning, program planning and policy analysis.

The branch is divided into three sections.

Impact Assessment

Environmental land-use planning and the assessment of environmental impacts of proposed projects and development are the principal concerns of this section.

The Impact Assessment Section's major undertakings in 1972-73 include:

- Development of a policy proposal for a formal environmental impact analysis system to be applicable to Ontario Government projects and, progressively, major developments in the private sector.

- External consulting on environmental planning matters and participation in liaison committees and Task Forces such as the Niagara Escarpment Task Force, the Joint Environmental Coordinating Committee for North Pickering and Toronto Area Airport projects, the Liaison Committees for Northern and Eastern, and Central and Southwestern Ontario, the Wasaga Park Community Project, the Simcoe-Georgian Task Force and the Minesing Swamp

Technical Committee.

- Input to the assessment of environmental impacts of large public projects such as Hydro transmission lines, transportation corridors and sewerage.
- Mapping of areas physically unsuitable for urban development.
- Coordination of the investigation of the environmental effects of development of the Onakawana lignite deposit.

Planning, Programming and Budgeting

This section is responsible for the implementation of the planning, programming and budgeting system (PPBS) within the Ministry. Assistance is provided to program managers in the identification of goals and objectives, the analysis of alternative strategies, and the development of criteria to measure program achievement.

Within the past year this section participated in the coordinating group responsible for the preparation of the multi-year plan and developed proposals for an integrated Ministry planning system.

Section activities included involvement in an inter-ministry study of techniques for output measurement, work on the refinement of Ministry program structure, with emphasis on documentation of operational systems within the Water Management program and liaison

with several central agency studies, including Task Force Hydro and the Task Force on Decentralization of Government Administration.

Policy Analysis

An internal consulting service is offered by this recently established section. Specific areas of expertise include consultation on applications of management science, operations research and systems planning techniques and economic analysis of proposed projects, policies or legislation.

Staff from all sections of Strategic Planning are often involved in special projects and studies as assigned by the Ministry executive. In the past year, a very significant amount of staff time has been invested in the Field Study Task Force, the Task Force on Approvals, and the Task Force on the Role of the Ministry.

Financial and Administrative Services

ADMINISTRATIVE SERVICES

The Administrative Services Branch is responsible for providing support services to the Ministry in the areas of office services, supply, printing, libraries, accommodation, and systems and electronic data processing.

Two major objectives for the year were realized. The branch started implementation of the ministry's Policy and Procedures Manual and coordinated the conversion to post audit as required by Management Board for all Ontario Government ministries. In this regard, new methods and procedures to meet internal control requirements were developed and implementation began early in January, 1973. Conversion to post audit was requested in March, 1973.

The reorganization that took place because of the formation of the new Ministry of the Environment, resulted in staff savings and this permitted the establishment of new senior positions to manage the Supply Section, Printing Services Section and the Policy and Procedures Manual.

Office Services

This section is responsible for accommodation and parking, communications, records management, stockroom, mail and messenger services and security.

The formation of the Ministry required major changes in accommodation. In Metropolitan Toronto, staff is now located at 135, 40 and 1 St. Clair Avenue West, 880 Bay Street, 4375 Chesswood Drive, and Resources Road. Mail and messenger services for all downtown

locations have been consolidated. Their reorganization also permitted the branch to reduce duplication of office supplies and to establish a user catalogue for supplies.

Considerable activity was required in providing field office accommodation and in the consolidation of individual offices.

Printing Services

Because of the distance from Queen's Park, the print room was allowed by the Ministry of Government Services to continue satellite operations. Some equipment and procedures changes were introduced to provide more economical printing service. A new job-costing and stock-control system was established to evaluate the development of a user charge-back system.

As a result of the Visual Identity Program, coordinated by this section, forms management, especially design work, increased. Changes to some photocopy equipment were made to achieve standardization and to reduce costs.

During the year 1,171 forms currently used were identified and catalogued. The internal printing facilities handled 4,165 jobs, producing in excess of 7.24 million impressions, up 18% from last year.

Supply

A significant workload increase was evident in the Purchasing Unit. The

number of purchase orders processed was up 24% over last year, with an attending increase in dollar value exceeding 30%. The same is true of the Laboratory Stores Unit, which received 144,715 samples in 1972, compared with 128,465 in 1971 — an increase of 12.7%.

The construction of a major addition to the laboratory complex is on schedule. The test-wing phase was recently completed, and the production shops and motor vehicle repair unit of Operating Services are now occupying their new quarters.

The Research Branch is presently setting up equipment to carry out pilot studies in the test area. It is anticipated that the new laboratory-wing phase will be ready for occupancy early in 1974.

Library

The formation of the Ministry placed heavy demands on the library services this year for material that encompassed all environmental subjects.

Because the library's resource material had previously been focused on subjects related to water, the library relied on interlibrary loans to provide information on many other subjects. As plans for expansion of the library's holdings are realized, the library will more readily be able to meet the information needs of the entire Ministry.

Systems and EDP

The Systems and Electronic Data Processing Section is responsible for the development, implementation, opera-

tion and maintenance of information systems.

The section's projects during 1972/73 included: expansion of the Water Quality Information System and of the Water Wells Information System, development of a regional dispersion model for use in the Hamilton Harbor Study, development of a water quality model for use in the Thames River Basin Study, development of a hydrologic modelling system for use in the International Hydrologic Decade Program, development of a treatment works management information system, development of automated processing systems for the analysis of surveys of derelict motor vehicles and of litter, development of an industry management information system and development of a computer-based financial services system.

During the year the number of documents received, processed and key-punched and the number of jobs run on the computer increased considerably, because of the implementation of new systems and the Ministry's expanding need for more information.

FINANCIAL SERVICES

The Financial Services Branch is organized to meet its responsibilities in the following areas:

Management Reporting

This section reports and interprets information to help senior management and program directors to focus on operating problems and opportunities.

Since the last annual report, there has been a gradual and rational evolution in the role of Management Reporting. The section is now responsible for the coordination and presentation of the Ministry's multi-year plan in addition to the preparation of the budget.

It is also responsible for the development of performance measures and the coordination of information flow to and from the Ministry.

In response to the expected needs of the Ministry, the section is strengthening its competence in the fields of quantitative analysis and development and implementation of a machine-based management information system.

Capital Financing and Revenue

This section is responsible for management and control of the Ministry's capital financing, revenues and assistance programs. During the year, emphasis was

placed on increasing the role of this section within the Financial Services Branch, and in development and implementation of accounting and financial procedures in keeping with reorganization and automation.

A dominant role was also taken in assisting other branches, ministries and municipalities with financial problems related to the water management program.

Internal Audit

This section was changed to reflect a management audit role in line with the government's emphasis on post audit operations.

General Accounts

During the year, this section was reorganized and new procedures were implemented to increase efficiency and strengthen management controls.

As part of the reorganization, the function of invoice verification was transferred to the General Accounts Section, and a special accounting services unit was established to incorporate the functions of insurance, banking, cheque distribution and reconciliations.

In addition, a data preparation unit is now in operation to meet the needs of an automated financial system.

Laboratory and Research

LABORATORY

The Laboratory Branch provides analytical support for Water, Air and Land Management programs carried out by the Ministry. An on-going program of method development is carried out to maintain a high level of capability in measuring existing and new types of pollutants. Scientific expertise is provided in assessing environmental hazards.

The laboratory conducts a wide range of analyses at the central laboratory in Toronto and has the capability to perform routine-type analyses at regional laboratories located in London and Thunder Bay. A separate laboratory in Toronto provides the analytical support to Air Management programs.

The accompanying graph indicates the number of samples received and the number of tests performed by the Laboratory Branch from April 1, 1972 to March 31, 1973.

Chemistry I

During the year, new or improved analytical methods were tested and adopted for iron, sulphates, detergents, conductivity and turbidity. The analytical quality control program was substantially improved by increasing the frequency of control testing and by participating in exchange sample programs with other agencies.

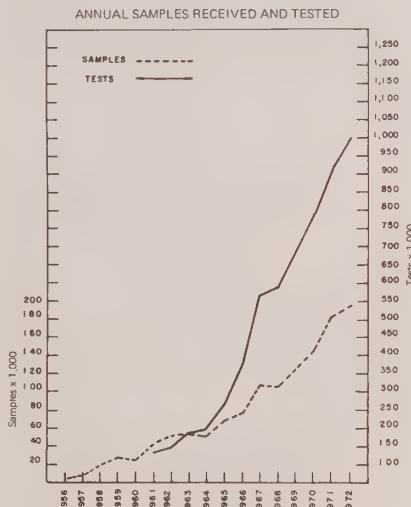
At the Thunder Bay Regional Laboratory, method development and training in the use of an atomic absorption spectrophotometer culminated in the application of this instrument to the routine analysis of five metals.

Work was carried out on three lakes to evaluate the effectiveness of artificially induced destratification (AID) as a means of improving water quality. The water in the lakes is kept fully mixed by an air stream injected at the bottom through a perforated hose. Mixing maintains oxygen in the water and consequently supports desirable life forms which otherwise would perish for lack of oxygen.

The studies are cooperative ventures with the Ministry of Natural Resources, Conservation Authorities and private individuals. The original experiment reached its second phase with the stocking of 1,200 trout which grew well over the summer.

Chemistry II

The section performed over 90,000 tests during the year, an 8% increase over last year.



INORGANIC

Extensive work was carried out to develop more sensitive procedures for detecting trace metals in the environment. Many improvements to the existing atomic absorption spectrometry techniques were made to achieve better precision and accuracy in trace metal work. New techniques for measuring selenium were evaluated. This metal has assumed new importance because of its potential toxicity and its alleged ability to counteract mercury's toxic effects.

The mercury laboratory continued to analyze large numbers of fish, sediment and water as part of the Ministry's mercury monitoring program. Many new improvements were introduced, including a modification which enabled the analyst to measure mercury in water in the parts per trillion range.

A major effort was extended in improving the quality control of the analytical work. The laboratory participated in sample exchange programs with other Canadian and U.S. agencies and, in addition, maintained a comprehensive internal quality control program.

ORGANIC

Petroleum hydrocarbon analysis increased in importance, due to the number of court cases involving oil pollution. Paralleling the trend towards larger fines in these cases, the defendants have been using more prominent defence counsels and hiring expert witnesses to fight these cases.

Staff prepared for publication several papers on the environmental effects of pollutants such as polychlorinated biphenyls (PCB's) and mercury.

Bacteriology

The Bacteriology Section was involved in a number of programs ranging from municipal drinking water analyses, Recreational Lakes and Great Lakes water quality assessments and the assessment of new parameters for bathing waters.

Staff participated in International Joint Commission (IJC) programs on Rainy River, and the production of a draft report on the status of viruses within the Great Lakes.

OVERSEAS ASSIGNMENT

In addition to work within the province, the supervisor of the section completed a two-month tour of duty in the Caribbean Islands organized by the Government of Canada in conjunction with the World Health Organization (WHO). This work was part of a continuing effort by WHO to improve the quality of drinking water on the British West Indian Islands.

Methods of water quality improvement and training in water quality testing were the specific subjects covered during this tour of duty, and a comprehensive report dealing with each country's requirements was prepared.

DRINKING WATER ANALYSES

Quarterly reports were prepared on bacteriological results of drinking water analyses for municipalities submitting samples to the Toronto, London and Thunder Bay regional laboratories. These reports indicated the overall drinking water quality for each municipality. Those municipalities whose drinking water quality exceeded or approached the

present 'Drinking Water Objectives' were brought to the attention of the sanitary engineers for corrective action.

RECREATIONAL LAKES

Spring, summer and fall field surveys were completed on fifteen lakes in the south-central and south-eastern region of Ontario. Another ten lakes had only spring and summer field surveys. A 45-day intensive survey of Jerry Lake situated in an undeveloped area was also completed. The microbiological data was statistically analyzed and reports were being prepared for amalgamation with work of other Sections into overall reports.

TAXONOMY STUDIES

The branch undertook literature survey and assessment of the methods for isolating and enumerating the *Pseudomonas* group of bacteria. Certain species of these bacteria are associated with eye, ear, nose and throat infections, and pose a health hazard when associated with bathing waters. Samples from the Lake Ontario waterfront were used in these studies. This work was continuing and a report on the findings will be forthcoming in 1973.

Air Quality Laboratory

The Air Quality Laboratory was integrated within the Laboratory Branch on April 1st, 1972.

The total number of analyses carried out increased 7% over the number car-

ried out in the 1971/72 fiscal year to a total of 64,000.

FIELD INVESTIGATION

The Field Investigation group carried out surveys in Hamilton, Toronto, Cornwall, Hawkesbury, Marmora, Niagara Falls and Welland, by means of a mobile laboratory facility. Pollutants such as sulphur dioxide, sulphur trioxide, particulate matter, fluoride, hydrogen sulphide, carbon monoxide, oxides of nitrogen and hydrocarbons were measured.

HEAVY METALS SURVEY

In excess of 14,500 analyses for heavy metals were conducted on samples taken from industrial, highway, urban and rural areas. These have included arsenic, cadmium, chromium, copper, iron, nickel, lead, manganese and vanadium. Additional work has been carried out on the development of methods for pollutants which are relatively difficult to analyze, such as selenium, beryllium and boron.

POLYNUCLEAR HYDROCARBON SURVEY

The first year's survey for benzol(a)pyrene and benzo(k)fluoranthene in the air of eleven urban communities in Ontario has been completed. A paper relating to this work was presented at the National Conference of the American Chemical Society in New York.

A rapid method for determining the polynuclear aromatic hydrocarbons in the air has been developed using a simple colorimetric method.

VEGETATION AND SOILS LABORATORY

The Vegetation and Soils Laboratory received sample submissions requiring a total of 33,000 analyses, an increase of 32% over last year's figure. Analyses were conducted for fluoride, chloride, phosphorus, total sulphur, boron, and metallic elements in prepared vegetation and soil samples. Automated and X-ray techniques were used to handle this large number of samples.

RESEARCH

Research services are provided to all of the operating branches of the Ministry of the Environment and to management. The programs are assigned on the basis of primary interest in the field of engineering investigations, non-engineering investigations and field application of advanced methods. Within these fields there is a further specialization of personnel to provide technical advisory service in methods of treatment of water, wastewater and industrial wastes to the Ministry of the Environment and to municipalities.

Applied Science

PHOSPHORUS REMOVAL IN CONTINUOUS DISCHARGE LAGOONS

Alum has been injected directly into the influent to the east cell of the Shelburne lagoons for a period of six times the theoretical retention time. At a dosage of 170 mg/l (Al:P ratio of 1.05:1), 80% of the influent phosphorus was retained in the cell.

Suspended solids and BOD removal were increased slightly. The addition of alum did not appear to upset the natural biological processes of the pond.

SPRAY DISPOSAL OF LAGOON EFFLUENTS

Shelburne

This program was initiated in 1971 to

determine the maximum effluent which could be applied to a moderately permeable soil without causing clogging, surface runoff, contamination of the groundwater or damage to vegetation. In 1972, sections of the spray area were cultivated and planted with rye grass and corn to observe results of the effluent spray on these crops.

Smithville

Effluent from the Smithville Lagoon has been sprayed on the surrounding land for a period of five months to assess the effects on a relatively impermeable (clay) soil where considerable runoff would be encountered. Approximately 10.7 million gallons were sprayed on 16 acres of land.

Results indicate 50% phosphorus and 80% ammonia reduction compared to the lagoon effluent. An increase in nitrate concentrate in the runoff was observed. Percolate samples from surface lysimeters had phosphorus and ammonia concentrations consistently less than 1.0 mg/l. This program will be continued next summer to determine optimum spray application rates.

MOVEMENT OF CONTAMINANTS FROM SURFACE WASTE WATER DISPOSAL SYSTEMS

In recent years there has been increased emphasis on the use of soils for the renovation and disposal of waste water and sewage effluent. The Research Branch is conducting a study to measure the movement of contaminants from subsurface disposal systems and to determine the effect of the type of waste water pretreatment on the movement of contaminants from these systems. This

study, initiated in 1972, will continue into 1974, and will provide information supplementary to the spray disposal programs, in addition to data unique to the project.

CENTRIFUGATION OF WASTE WATER

A study was undertaken to determine the feasibility of removing suspended solids from raw waste water by centrifugation. This unit may provide a practical alternative to primary gravity sedimentation in an advanced physical waste treatment process.

SEWAGE TREATMENT PLANT EFFLUENT DISINFECTION

Field tests were completed and a report prepared on the evaluation of a Sanuril Wastewater Chlorinator for its usefulness in chlorinating treated effluents from small package types of sewage treatment plants. This is a simple dissolving apparatus which can dispense chlorine from tablets of stabilized chlorine compound. Because it has no moving parts nor requires any power, it requires no attention for days or weeks at a time.

The use of ozone for sewage disinfection was also examined but this work has to be temporarily discontinued because of a malfunction which developed in the ozone generating equipment.

AN INVESTIGATION OF SEWAGE TREATMENT PLANT ODORS

A cooperative program between the Research Branch and the Air Management Branch to investigate operating waste

water treatment plant odor source and control methods, begun in 1971, was completed in 1972. The greater number of odor problems investigated resulted from operational upsets and were corrected by the plant personnel.

Odor problems were experienced at two installations which were operating above their design capacities. These plants were scheduled for expansion in 1972. Malodors occasionally emanating from one installation appear to occur because of the large physical size of the plant.

REVERSE OSMOSIS TREATMENT OF CHEESE WASTE

An internal report was prepared on the membrane processing of cheese whey by the use of reverse osmosis and ultrafiltration. It is based on the information published in the literature and a review of work by research staff with a laboratory RO unit on cheddar cheese whey.

Further work with a larger unit is under way at a cheese factory to study the feasibility of employing the RO process for concentrating cheese whey.

WATER CONTAMINATION CAUSED BY OUTBOARD MOTORS

Following the preparation of a report on water contamination caused by two-cycle outboard motors, discussions continued within the Ministry concerning the potential impact outboard motor operation can have on the environment. An effective dialogue has been established between the Ministry and the outboard motor manufacturers in Ontario.

OIL SPILL CLEAN-UP

Work involving the standardization of testing methods for oil spill treating agents (OSTA) was continued from the previous year. Considerable time was spent on working with the Simulated Environmental Tank (SET) to determine its suitability as a standard test in accordance with the acceptability criteria for OSTA which was published by the Industrial Wastes Branch.

WEEPING TILE FLOW

A report presenting data, accumulated over a period of 18 months, providing information on the quantity and quality of water which may be contributed to sewage systems from building weeping tile was published and after review by engineers from municipalities in Ontario, the City Engineers Association requested an extension of the project to determine design criteria and techniques to limit such flow which has been shown to be of high quality and not insignificant quantity.

USE OF PLASTIC PIPE FOR SEWERS

A report based on work carried out over a period of one year was published, recommending the acceptance of plastic pipe for use as gravity-flow sewers, with some pipe design and installation reservations. Canadian Standards Association and the pipe manufacturers are currently working on specification revision and pipe construction respectively.

MISCELLANEOUS

Laboratory tests were conducted on samples of fly ash to determine the levels

of dissolved solids that may be expected to build up in the recirculating water used in the removal of the fly ash from coal-fired power generating stations.

Time and effort were also devoted to the testing and evaluation of new chemicals and equipment developed for use in water purification and pollution control. In some cases, by-products derived from waste treatment processes were examined and assessed for any pollution problems that may arise from their disposal.

Some examples of this are:

- Chemical additives for holding tanks and portable toilets for boats.
- Water filter for householder's use
- Wool batts for oil spill clean-up
- Solidified sludge from 'Chemfix' process
- Sinking agents for oil spills.

Nutrient Removal/ Special Studies

FULL-SCALE PHOSPHORUS REMOVAL FACILITY

Investigations of phosphorus removal from municipal waste-water by the lime treatment process continued at the Newmarket-East Gwillimbury WPCP through 1972, although the actual operation of the phosphorus removal facility was transferred from the Research Branch to Project Operations Branch staff towards the end of the year.

Under the Canada/Ontario Agreement a detailed investigation of the operation of the anaerobic digester as related to the treatment of lime sludge has been established.

BIOLOGICAL NITRIFICATION-DENITRIFICATION STUDIES

A three-phase nitrification-denitrification study program partly funded under the Canada/Ontario Agreement has been established. The first phase, now completed (Research Paper W2029), consisted of a pilot biological reactor study. The second phase involves the full-scale evaluation of biological nitrification-denitrification at the Newmarket WPCP. The third phase consists of studies involving a portable nitrification-denitrification pilot plant which can be transported to various sewage plants for different wastewater comparisons.

It is anticipated that the information obtained from these three phases will support guidelines to possible future regulations regarding allowable nitrogen levels in sewage effluents.

PHYSICAL/CHEMICAL TREATMENT OF SEWAGE

This project involves work at three locations. At Bala a pilot chemical treatment plant has been installed to provide for the removal of the phosphorus from Bala sewage discharged to CNR Bay. Studies are being conducted on CNR Bay to determine the effects of the phosphorus removal process.

At Maple, a chemical treatment plant has been installed to provide phosphorus removal from the wastewater of the Ministry of Natural Resources Station. Besides investigating the treatment process and process control methods, studies of the receiving water are being carried out to determine process effects.

At Point Edward, a physical/chemical sewage treatment process evaluation is being carried out under the

Canada/Ontario Agreement. This facility is being designed to establish physical and chemical modular processes to provide from partial-to-complete treatment of sewage. Ultimately this facility will consist of the following processes:

- Chemical precipitation, including flocculation and clarification for phosphorus removal.
- Sand filtration for improved removal of suspended solids.
- Carbon adsorption for increased organics removal.
- Ion exchange for ammonia removal.

ACTIVATED CARBON TREATMENT OF SEWAGE

An activated carbon study was conducted to provide preliminary data for use in wastewater treatment.

Primary clarifier effluent receiving phosphorus and suspended solids removal by the lime treatment process was fed to the activated carbon columns, without pH adjustment, for further solids and organics removal.

The pilot carbon test was performed to define linear flow rates, backwash rates, column exhaustion times, effects of biological activity and other features required for scale-up to a commercial installation.

LAKE RECLAMATION STUDIES

Observations of the receiving water of the Bala phosphorus removal facility were continued throughout 1972. Alum precipitation made to the receiving water, CNR Bay, during June 1970, precipitated approximately 95% of the phosphorus, mostly in the form of algae, from the bay water. Release of the phos-

phorus from the bottom, however, occurred during 1971 and algae concentrations within the bay were as high as ever during 1972, and adverse effects of the bay effluent were noted on downstream Long Lake.

A further application of alum to CNR Bay is scheduled for the early spring of 1973 before the soluble phosphorus, now as high as 0.62 ppm is taken up by algae growth. It is anticipated that such an application will have a lasting effect on CNR Bay reducing any further effects on Long Lake.

LYSIMETER STUDIES WITH CHEMICAL SLUDGES

Lysimeter studies are planned to determine the fate of heavy metals and nutrients when applied to farm land in the form of chemical sludges.

The movement of the above elements through soil, and any danger of ground water contamination will receive particular attention.

CHEMICAL SLUDGE TOXICITY AND FERTILITY

The new chemical sewage sludges produced from phosphorus removal facilities are expected to contain higher quantities of heavy metals as well as the nutrients, nitrogen and phosphorus. Heavy metals could result in toxicity to plants or animals, while the sludge could act as an excellent source of nutrients if these sludges are applied to agricultural soils.

Chemical lime sludge from the Newmarket phosphorus removal facility is being tested in greenhouse pot experiments to determine its nutrient value to the soil and possible toxic effects on

plant growth.

Based on results obtained to date, Newmarket lime sludge seems to supply all the nutrients required for healthy plant growth, while no toxicity effects to plant growth have appeared at sludge application rates of up to 80 tons per acre.

Future studies will relate chemical sludge application to heavy metal accumulation in plants, soil and possibly ground water.

FARM ANIMAL MANURE MANAGEMENT

Involvement in the farm animal manure management problem is continuing through the following activities:

- Attendance at interministerial meetings.
- Visits to the University of Guelph pilot manure treatment facilities.
- Presentation of a paper at a county agricultural conference.
- Participation on a panel discussion at the annual Soil and Crop Improvement Association meeting.
- Assistance to agricultural personnel and university students in carrying out manure management studies.

OUTSIDE CANADA/ONTARIO AGREEMENT CONTRACTS

The Nutrient Removal/Special Studies Section is involved in several outside projects established under the Canada/Ontario Agreement. Besides acting as a Contract Liaison Officer (CLO) to a project dealing with heavy metals in chemical sewage sludges and as an assistant CLO to a project dealing with nitrogen removal from wastewater, a

member of staff is on a sludge disposal working group established to coordinate the various projects on chemical sewage sludge disposal, under the Canada/Ontario Agreement.

PHOSPHORUS REDUCTION IN LAKES

To test the feasibility of phosphorus reduction in small eutrophic lakes by chemical addition means, two series of in situ studies were set up in large plastic columns in a central Ontario resort area lake. Using chemicals found most suitable in jar test work, application to the columns effected an initial high removal of phosphorus.

Subsequently, however, in most instances there was a slow release of phosphorus until the original concentration was reached. This apparent lack of success may have been due to the abnormally low levels of phosphorus in the lake during 1972. Further testing is required for the proper evaluation of this method of phosphorus reduction.

PHYTOPLANKTON NUTRIENT RELATIONSHIPS

Continuing phytoplankton research in water management includes investigations on the characterization and treatability of undesirable tastes in water supplies and filter clogging problems associated with algae. Major emphasis has been focused on determining the factors which result in excessive obnoxious developments of phytoplankton in the inland lakes of Ontario.

Beginning in 1967, twelve locations were examined, from the headwaters of the Trent Watershed to Lake Ontario.

Deductions regarding phytoplankton nutrient relationships in these locations have subsequently been tested using controlled fertilization tube experiments in a moderately alkaline mesotrophic lake.

During 1972, similar tube experiments were carried out to study the impact and fate of three nutritive materials, carbon, nitrogen and phosphorus, in an extremely low alkalinity oligotrophic lake in Haliburton County.

From such studies guidelines are being developed with respect to the impact of nutrient inputs, amenable to control, which will minimize the impact of cultural practices on adjacent inland lakes.

EUTROPHICATION OF SOFT-WATER LAKES

In 1970 three small soft water lakes in the Elliot Lake area were fertilized with various simulated waste treatment effluents. Monitoring of the lakes is continuing in order to study the recirculation patterns of the nutrients added in 1970.

BENTHIC FAUNA IDENTIFICATION

Several collecting trips were made to the Muskoka Lakes for further midge collections. These were reared for identification and the results have been incorporated into the Muskoka report.

Water

Development of new municipal water supplies necessitated a number of treatability studies in communities such as

Markdale, Beardmore, Rainy River, Le Faivre, Verner, Deep River and Latchford, to determine processes and chemical dosages to produce acceptable treated water quality. Detailed recommendations were then prepared by the branch, who were also involved in discussions regarding design reports of the retained consultants for plants such as Fauquier, Harrow, Espanola and Barry's Bay.

A number of plant reviews for other communities such as Port Rowan, Port Hope, Timmins, Goderich, Port Elgin and Haileybury were carried out to examine operational problems and determine optimum chemical dosages. Adjustment of chemical dosage, point of application and the use of coagulant and filter aids helped to improve plant operation and treated water quality and produce a distributed water with a non-corrosive pH.

Possibilities for plant capacity uprating were examined at communities such as Delhi, Owen Sound, Cedar Springs, Leamington and Port Dover. The increased capacity was often achieved by the application of chemicals to give improved clarification and in a number of cases by changing filter media to allow higher rate filtration.

Taste and odor problems were investigated at Port Colborne, Guelph, Cambellford, Ajax, Bradford, Dresden, Woodstock and Amora. In the majority of occurrences, improved chlorination or other oxidant application was successful in treating the problems.

The mechanisms involved in the sequestering of iron and manganese by sodium silicate addition have become more clearly defined and improved techniques for this type of control should be forthcoming. The level of sodium silicate needed to control iron

and manganese, was determined in a number of new and operational well water supplies such as at Beeton, Markham, Lambeth, Lowther and Fenwood Gardens in Belleville.

Certain well water supplies had iron and odor problems which were determined to arise from traces of organics present in the water, such as methane, which promote bacterial growths in distribution systems. In some of these problems, the taste was successfully treated by allowing iron removal filters to operate biologically, removing the organics. Post chlorination followed.

A problem of reduced flows in the Arva to London pipeline was investigated. It had been claimed that residual aluminum from the Lake Huron WTP, which had been deposited in the pipeline was the cause of the reduction. A program was initiated to examine the factors which could contribute to the problem.

Sections of the 42 inch pipe with the lowest C-factor were observed by a diver, however, no obstruction was found. Flow profile tests and removal of the deposit by alkaline addition to the water supply should help to clarify the cause of the loss of carrying capacity of the pipeline.

Throughout the year the branch has participated in meetings which discussed the Sabiston chemical land-fill site. This site was thought to be the possible cause of the taste problem which had been occurring in the Markham Township water supply.

The biologically active filters at the John St. WTP appear to be degrading the taste-producing compounds. Restrictions have been placed regarding the type of waste which can be dumped at the site. In addition, proposals have been made for methods of determining the possible

route by which any dumped chemical could infiltrate the well aquifer.

SAND FILTRATION

Monitoring of existing iron removal filters had indicated that biological activity in the presence of oxygen was substantially altering the nitrogen and carbon forms across the filter. Laboratory scale tests were instituted to determine the suitability of such a process for the removal of some common taste and odor-causing substances, and also virus. Results were not encouraging as maximum rates of flow were too low and while good taste removal was effected on some substances such as phenol and amines, no removal was detected on the more problematic compounds such as chlorophenol and geosmin.

At low flows, 12 inches of sand provided complete virus removal.

ANALYSIS OF VOLATILE FATTY ACIDS

An improved method was investigated for analysis for volatile fatty acids in sewage digester sludges. The proposed method was gas chromatographic using flame ionization detection. The response of the detector can be calibrated independently against each individual acid, thus enabling the analyst to quantitize each acid rather than obtaining a total value.

Microbiology

VIRUS MONITORING

Monitoring programs for enteric virus, *Salmonellae* and coliforms were continued into 1972 at various study sites.

At Shelburne and Smithville there was no evidence that the spray irrigation

of the land with lagoon effluent resulted in significant contamination of stable water wells, ground water, or crops, with any of these microorganisms.

At Wallaceburg, where sewage sludge was spread on agricultural land served by underdrains, no viral contamination of the underdrain water could be detected. Some bacterial contamination appeared at one period, but this was probably due to a washing off of organisms from the soil surface following particularly heavy rainfall.

GAMMA IRRADIATION

In a series of laboratory experiments using the Gammacell 220, it was established that treatment of bacterial suspensions with low doses of chlorine rendered the cells less able to survive subsequent irradiation.

The pilot scale gamma irradiation unit, which was installed and brought on line at Burlington WPCP in November, by Geodel Inc. was operated initially to deliver a dose of 5×10^4 rads to clarifier effluent. At this dose, the amount of nitrate increased by a factor of from 10 to 40, coliforms were reduced 90 - 95%, fecal coliforms by about 60% and fecal streptococci by only 50%.

Total bacterial counts were reduced by about one order of magnitude and bacteriophages (bacterial viruses) were reduced in number upon irradiation, but were not eliminated from the effluent. Goldfish, which were maintained in aquaria continuously fed with the undiluted effluents, showed no apparent toxic effects in either irradiated or normal effluent. Protozoa and nematodes in the effluent were still viable following irradiation, but may not have been capable of development or reproduction.

Waste Water

Although one of this section's continuing functions has been providing technical assistance to municipalities and industries encountering operating problems at their treatment plants, this year saw a marked shift toward providing technical assistance in full-scale phosphorus removal studies being conducted by municipalities and consultants. Considerable section effort was also directed into the conducting of research studies under the Canada Ontario Agreement on the Lower Great Lakes.

In 1971, a program described as Chemical Process Criteria for Phosphorus Removal (CPCP) was undertaken to provide the necessary information when considering phosphorus removal for various types of waste water treatment facilities, e.g. aerated lagoons, oxidation ditches, contact stabilization plants, primary plants, lagoons, etc.

The results of the completed CPCP programme have indicated that phosphorus removal can be readily implemented in the majority of WPCPs with minimal capital expenditure and virtually no need for altering operational procedures. As expected, the work has also indicated that no one prime coagulant can be universally applied for successful phosphorus removal at waste water facilities.

Although the methods of implementing phosphorus removal in mechanical plants became well established, it was necessary to investigate means of providing phosphorus removal at waste stabilization pond systems. Studies on batch chemical treatment of seasonal retention lagoons indicated that excellent effluent quality and a high degree of phosphorus removal could be attained through this method of

batch chemical treatment prior to discharge.

With regard to continuous discharge stabilization pond systems, studies are presently continuing at three lagoon systems involving the continuous application of liquid alum, liquid ferric chloride, and lime slurry to the respective raw sewages.

Research studies, funded by the Canada/Ontario Agreement, were undertaken in four major areas: phosphorus removal, activated carbon, effluent polishing, and stormwater treatment.

As recent critical evaluations on assimilative capacities of receiving streams has led to the imposing of high effluent quality objectives for discharges from some WPCP's, a study was undertaken to determine whether a high quality (5 mg/l BOD, 5 mg/l SS) effluent could be attained through the filtration of secondary effluents in conjunction with the addition of low dosages of prime coagulant and/or polyelectrolytes.

A second objective of this study was to determine the quality of effluent obtained through filtration of chemically treated sewages and to assess the associated operational characteristics of such filter performance.

The research study into the application of both powdered and granulated activated carbon was undertaken to determine if additional treatment can be obtained through the use of activated carbon within an existing treatment facility.

While the problems of bypass and combined sewer overflows are well documented and although work is continuing to further define the nature of this form of water pollution, research efforts are being directed towards treatment of these waste waters.

A research study being undertaken

in this area is to establish the unit operation feasibility of treating bypass and stormwater overflow with a high rate fine mesh screening unit and to determine the degree of treatment of such waste waters that is attainable with this unit.

A secondary objective of this study is to determine the possible application of such a unit as a tertiary treatment device, especially with respect to post-treatment of waste stabilization pond effluents.

Staff has also acted as liaison officers for research studies being funded under the Canada/Ontario Agreement and being conducted by organizations outside the provincial and federal governments.

Staff assisted the Training and Licensing Section of the Sanitary Engineering Branch in developing an activated sludge workshop designed to provide the necessary degree of operator training and knowledge required for successful operation of secondary treatment systems. Four such workshops were conducted in 1972 with staff of this section responsible for the presentation of all course material and demonstration of all practical or hands-on aspects.

Technical assistance continued to be given to the Project Operations and Industrial Wastes Branches in the areas of WPCP operation and waste water treatability studies being conducted.



Ministry
of the
Environment

1973/74 bound separately

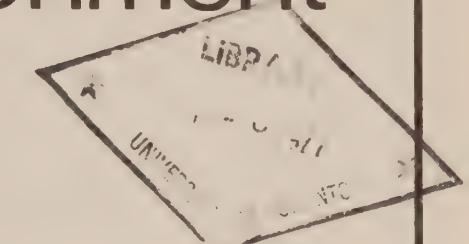
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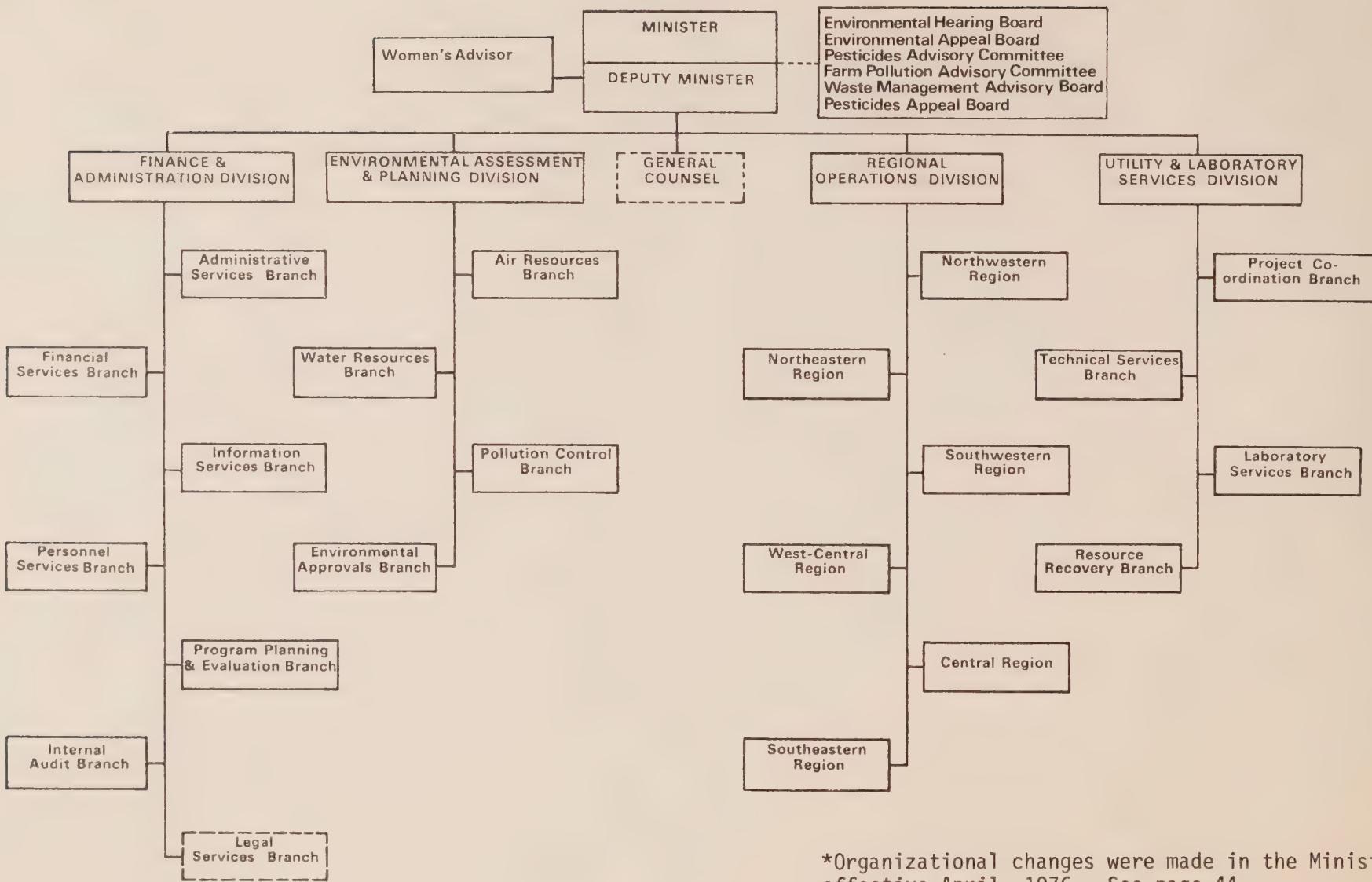


Ministry of the Environment



Annual Report 1974-75

MINISTRY OF THE ENVIRONMENT
1974-1975



*Organizational changes were made in the Ministry, effective April, 1976. See page 44.

contents

Organization Chart	Frontispiece	<u>Finance and Administration Division</u>	37
Letters of Transmittal	2	Administrative Services	37
Progress Report	3	Financial Services	38
A Record of Achievement	4	Information Services	39
 <u>Environmental Assessment and Planning Division</u>	 6	Legal Services	40
Air Resources	6	Personnel Services	40
Water Resources	9	Program Planning and Evaluation	41
Pollution Control	12	Internal Audit	41
Environmental Approvals	18	 <u>Boards and Committees</u>	42
 <u>Utility and Laboratory Services Division</u>	 24	The Environmental Hearing Board	42
Resource Recovery	24	The Environmental Appeal Board	42
Project Co-ordination	25	The Farm Pollution Advisory Committee	42
Technical Services	29	The Waste Management Advisory Board	43
Laboratory Services	30	The Pesticides Advisory Committee	43
 <u>Regional Operations Division</u>	 32	The Pesticides Appeal Board	43
Industrial Abatement	32	 Updated Organization chart	44
Municipal and Private Abatement	34		
Technical Support	34		
Utility Operations	35		



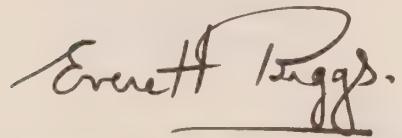
To:

The Honourable
George A. Kerr, Q.C., Minister.

Sir,

I have the honour to submit
for your approval the 1974-75
annual report of the
Ministry of the Environment.

Respectfully submitted,


Everett Biggs

EVERETT BIGGS
DEPUTY MINISTER



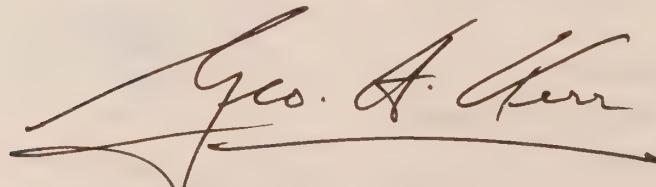
To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1974, and ending
March 31, 1975.

Respectfully submitted,


Geo. A. Kerr

GEORGE A. KERR, Q.C.
MINISTER

progress report

During the past fiscal year, the Ministry has made major strides in three emerging areas of environmental concern: trace contamination, waste management and environmental assessment.

Over the past ten years, science has found that certain man-made substances, such as DDT, mercury and PCBs, -- originally hailed as welcome and useful tools in our progressive society -- have potential serious long-term health effects.

Fortunately, environmental science has also developed to the point where persistent trace levels of these contaminants can be identified and measured. The Ministry is successfully meeting this challenge of detection and control.

With the expansion of its laboratories in June, the Ministry now has the largest and best equipped facilities of their kind in Canada and the installation of two electron microscopes has vastly improved its ability to monitor and assess the levels of trace contaminants in water. The result has been more effective pollution control programs.

In 1974-75, the Ministry's waste management plans also got underway. Designed to proceed over 15 years, the program has two phases: the reclamation of non-renewable resources from solid waste and the conversion of garbage to energy.

Construction of a unique experimental Resource Recovery Plant began in '75 and will be completed by the fall of '76. The plant will be used to research the treatment and reclamation methods necessary to make the project a viable one, will develop markets for reclaimed materials through private interest and will serve in some ways as a model for larger working plants throughout the province.

In tune with Ontario's Energy Management Program, Environment Ontario is also working on the use of garbage as fuel for plants, generating stations and heating systems. An agreement has already been signed with Ontario Hydro and Metro Toronto to construct a Watts From Waste facility at the Lakeview Generating Station in Mississauga which will ultimately turn one thousand tons of municipal waste each day into electrical power.

A record of achievement

Over the past twenty years, the field of environmental protection has grown rapidly from the concern of a few visionaries to the primary responsibility of well-recognized government departments around the world.

In Ontario, the Ontario Ministry of the Environment is responsible for the care and protection of the province's natural environment.

Since the establishment of the Ontario Water Resources Commission in 1958, the formation of the Department of the Environment and their amalgamation into the Ministry in 1972, the Ontario government's studies, legislation and programs have made the province a recognized leader in the environmental field.

Regional Service

In 1974-75, the Ontario Ministry of the Environment entered a new era of more direct service to the people of Ontario with a new regional structure. Regional offices in Thunder Bay, Sudbury, London, Stoney Creek, Don Mills and Kingston and district offices in 23 communities brought Industrial Abatement, Municipal and Private Abatement Services, Utility Operations and some Technical Support Facilities into closer contact with the communities they serve.

This provided local, direct response to municipalities in terms of the operation of water or sewage treatment facilities, the approval of municipal or private waste systems and other local service issues.

The previous distinctions separating air, water and waste problems in Industrial Abatement were broken down and Ministry staff, trained as specialists in the full spectrum of Industrial Abatement, took a more comprehensive approach to pollution control.

Scientific Support

During the fiscal year, increasing attention was devoted to improving the Ministry's capabilities in the detection, analysis and control of environmental contamination in its more subtle forms. The growing knowledge and concern about trace contaminants encouraged the Ministry in developing new laboratory and research facilities, which permit the completion of more than a million sample tests a year. This expansion has created one of North America's most sophisticated and versatile environmental laboratories to serve the Ministry of the Environment's programs.

Expansion of Services

The maintenance and improvement of water quality, and the need for expansion of basic services in support of Ontario's growth, brought an increase in water and sewage construction to produce a capital investment of \$127 million.

Where small municipalities are faced with high costs of service from plants constructed by the Ministry, they may receive subsidies up to 75 per cent of capital costs.

1974-75 was the first year of a program of provincial grants, paying 15 per cent of the capital cost of regional water and sewage works in restructured municipalities. This resulted in transfer payments of \$4,733,000. An additional \$182,000 was transferred as assistance specifically towards joint Ministry-Municipal projects.

New Waste Initiatives

Increasing concern over the rapid growth of solid waste

production in Ontario and the limitations of present waste disposal methods led to some major new thrusts in the areas of waste control and recovery. A new program, Resource Recovery, and a new Ministry branch were launched to develop reclamation of material and energy resources from garbage. This 15-year program ties central research facilities and market development to a long-range program of developing processing and recovery centres to treat and reclaim municipal waste across the province.

At the same time, some industries were given direction to curb the production of waste, and the Waste Management Advisory Board, composed of citizen members, was appointed to monitor this progress and to study specific areas of waste generation as well as some handling and recovery issues.

Legislation

Changes to existing legislation and the introduction of major new legislation brought new responsibilities to the Ministry, new services to the people of Ontario and a significant advance in the cause of environmental protection in this province.

Part VII of The Environmental Protection Act, 1971, was proclaimed to permit the Ministry to provide and maintain uniform provincial standards for private sewage systems across the province.

The Pollution Abatement Incentive Act, due to expire April 1, 1975, was extended for a year to continue a system of grants encouraging the installation of pollution control equipment.

Amendments were made to The Environmental Protection Act to provide for municipal control of noise pollution.

The Environmental Protection Act and The Ontario Water Resources Act were amended to accommodate significant new legislation -- The Environmental Assessment Act.

The new legislation, enacted in 1975, provides for the identification, review and control of the environmental effects of a proposed undertaking for the purpose of environmental protection.

Equal Opportunity For Women

In June, 1973, the Ontario government issued a green paper entitled: "Equal Opportunity for Women in Ontario: A Plan for Action" and established the Women Crown Employees Office. A Women's Advisor in the Ministry of the Environment was appointed to act in liaison with that office.

Since October 31, 1974, the Ministry of the Environment Women's Advisor has explained an Affirmative Action Plan at managers' meetings, involved women in the Ministry in career development workshops, worked with Ministry information staff on a special issue of an internal Ministry publication devoted entirely to women's issues, and as well, has counselled some women in the Ministry on matters concerning their careers.

As a part of International Women's Year, the Ministry decided to produce a film to emphasize the wide scope of career possibilities for women in the environmental field. The film will be used for recruitment and by teachers and guidance counsellors to encourage young women to enter science and engineering professions.

environmental assessment and planning division

The division audits the performance of the Ministry's operational programs, investigates the capacity of the environment for assimilating various types and quantities of contaminants and investigates new means of treating pollutants before they are discharged into the environment.

Over the past year, the division has played a significant part in the development of a new system of environmental assessment. Staff has also maintained and improved the Ministry's systems for monitoring contaminants of the air, land and water. The assessment of the monitoring has provided a firm foundation for abatement and control activities by Regional Operations Division and a reliable audit of the effectiveness of control and abatement measures.

1975 has seen significant advances in the Ministry's capacity to detect, measure and assess newly discovered types of pollution and closer links with environmental medicine and other agencies throughout the world has provided a better understanding of the nature and effects of various trace contaminants.

The division also maintains liaison with Canadian authorities and U.S. federal and state environmental officials to advance the progress of co-operative pollution control programs through the International Joint Commission and under federal-provincial and international agreements.

AIR RESOURCES BRANCH

The branch provides many of the assessment services in the control of man's impact on the air environment by (a) curtailing undesirable effects (b) monitoring contaminant levels and (c) research and development

efforts to ensure acceptable air quality throughout the province.

Enforcement and surveillance are the responsibilities of Regional Operations.

Air Quality and Meteorology Section:

During 1974-75, the network of air quality and meteorological monitoring stations was extended with new API stations in Windsor and Niagara Falls. In the Sudbury district, the Happy Valley station was moved to Coniston.

The Air Pollution Index is now issued regularly for Toronto, Hamilton, Windsor, Sudbury, Welland, Niagara Falls and Coniston.

The number of instruments in service increased from 975 in 1974 to 1,017 at the end of 1975, with more sensitive instruments based on chemiluminescence replacing instruments measuring oxidants and nitrogen oxides. A report on the air quality across Ontario was published in four volumes.

The monitoring program near lead smelters in the province was expanded and monthly reports issued on lead levels in the vicinity of Toronto's lead plants. Staff participated in the preparation of the Working Group Report on Lead and in the Environmental Hearing Board Public Hearings on Lead.

The air pollution emission inventory information system was updated and expanded to cover Metropolitan Toronto, Hamilton and the Niagara Peninsula.

Modelling of traffic simulations to predict concentrations of carbon monoxide were used to prepare an air quality impact study of various transportation plans in

Metro Toronto. A report was completed describing the effects of Toronto's transit strike on the air quality in the city. The branch continued to co-operate with U.S. air pollution control agencies in investigating air pollution crossing the border at the Niagara, St. Clair and Detroit Rivers.

Technology Development Section:

The section conducts special projects to determine the effects of specific air pollutants on the environment. It is involved in the development of instrumentation for ambient air monitoring and source testing with special emphasis on remote sensing. The section is also responsible for identifying latent and potential future problems of air pollution in Ontario and conducts investigations into the effects of unusual and hazardous materials.

In 1974-75, 16 special air quality surveys were conducted including the monitoring of such contaminants as lead, zinc oxide, polynuclear hydrocarbons, total and reactive hydrocarbons, sulphur dioxide, hydrogen sulphide and oxides of nitrogen. One survey was conducted in Minnesota jointly with state authorities.

Over 50 field tests of emissions were inspected by the Source Testing Unit and over 400 test runs evaluated.

Several urgent short-term studies were completed including emission control methods for asphalt plants, electrostatic precipitators for odour control, emission control methods for asphalt plants, and emission control of vinyl chloride and asbestos.

In addition, a comprehensive report on lead in the vicinity of secondary smelters was completed. A road study was conducted and a report on automotive sources and re-entrainment of dust was prepared. A field experimental program to determine the emissions, plume dispersion and chemistry and effects of pollution on the environment was conducted in Sudbury as part of the Sudbury Environmental Study.

A total of \$280,000 was granted to Ontario universities to support environmental research programs and seminars organized to review progress in the fields of atmospheric chemistry, development of instruments and methods control technology and the effect of smelter emissions on environment. Several research projects were carried out jointly with Environment Canada.

Criteria Development and Program Planning Section:

The section recommends revisions to existing legislation; ensures that published air quality objectives are consistent with current knowledge of physiological, vegetative and other adverse effects of air pollution; issues design standards for the assessment of contaminant emissions from specific industries and, where necessary, recommends industry-wide regulations for control of such emissions.

In 1974-75, activities included evaluation of the legal acceptability of various proposals relating to district heating in Metro Toronto; preparation of guidelines for assessment of cooling towers at the request of Industrial Approvals Section; initiation of a study into wind-blown dust from large storage piles (e.g. coal); and the writing of dispersion calculations to incorporate the requirements of new regulations (R.R.O.15/70 as amended by O. Reg. 873/74).

Standards and guidelines development included completion of a major revision of Ontario Regulation 15, R.R.O. 1970 and revision of the list of ambient air quality criteria. The list of design standards for air contaminants was increased from 20 to 84. Guideline values or tentative design standards for seven new air contaminants were issued. The section participated in the activities of the Safety Advisory Committee on the Uranium Hexa-fluoride Plant of Eldorado Nuclear Ltd. at Port Hope in assessment of the proposed extension plans and, in addition, assisted the Safety Advisory Committee on the operation of the Bruce Heavy Water Plant and proposed expansion plans for the unit by Ontario Hydro.

Tentative guidelines for control of drum mixer asphalt plants to be operated for the 1975 paving season were established.

Vehicle Emissions Section:

Concerned primarily with the control of the emission of pollutants from all motor vehicles, the section last year carried out spot-checks of nearly 10,000 vehicles at the Castlefield Avenue Test Centre in Toronto. In addition, the section operated an experimental test lane at Downsview in conjunction with safety lane inspections of the Ministry of Transportation and Communications. Out-of-town inspections were made during the summer at ten locations. Staff also investigated numerous complaints concerning the illegal sale of vehicles without pollution control equipment, and made a number of random spot-checks at dealerships in Southern Ontario.

Those stopped in spot-checks were given copies of a new pamphlet explaining the reasons for the inspection and remedial action that may be taken where applicable.

On behalf of the Ontario Development Corporation, Ministry of Consumer and Commercial Relations, the section checked out the usefulness of certain automotive add-on devices and fuel additives, claimed to be combustion improvers and pollution reducers.

With the help of the Ontario Provincial Police, 830 trucks were stopped with 105 warnings issued for smoke emissions and 725 vehicle owners charged. In addition, staff members visited transport companies to assist in solving problems of excessive vehicle smoke.

Phytotoxicology Section:

To provide a comprehensive knowledge of the effects of air pollution on vegetation throughout the province, the section investigated 247 soil and vegetation complaints in 1974-75. Contaminants found causing pollution

included fluorides, chlorine, sodium chloride, sodium sulphate, lead mercury, silver, arsenic, cadmium, zinc, nickel, cobalt, sulphur dioxide, sulphuric acid, ammonia, magnesium-lime dust, fertilizer dust and iron oxide. On two occasions fluorides were found to have affected livestock.

Salt damage to vegetation was investigated from a number of sources, including highway spray, storage piles, seepage from sand-salt piles, seepage from fur dressing operations, and salt cake emitted from pulp and paper operations. Soil effects caused by a sulphuric acid spill from a train derailment near Pelham were measured on several adjacent farms. Fluoride damage to vegetation was found in the vicinity of fertilizer, brick, aluminum hexafluoride, and hydrofluoric acid manufacturers. Acute sulphur dioxide injury to vegetation was discovered near pulp and paper mills and nickel, copper and iron concentrators and smelters.

Where the section was able to confirm reports of pollution-caused damage, reports were sent to regional Industrial Abatement staff for action as well as to the complainants, offending sources and the Board of Negotiation to settle on compensation payments. About one-half of the damage reports received from the public were found to have been caused by agents other than environmental conditions -- disease organisms, insects, physiological disorders and natural causes. For example, widespread browning of white cedar trees in Southern Ontario was diagnosed as being caused by leaf miner insects. Likewise, widespread occurrence of a white powder on vegetation and fallout of sticky substances was found to have been caused by powdery mildew fungus and aphid secretions respectively.

Ecological surveillance programs were carried out both in the vicinity of existing air pollution sources and future proposed major sources. A total of 2,357 surveillance station visits were made in Ontario in 1974-75. On both complaint and surveillance visits a total of 9,898 samples were collected for processing and examination

by phytotoxicology analysis procedures.

At the request of Industrial Abatement engineers, 83 potential sources of contaminants in Southern Ontario were investigated for the degree and extent of soil and vegetation effects in their immediate vicinity. Control orders and conditional approvals were served to fluoride and lead sources based on compliance with phytotoxicology guidelines. Comprehensive reports were prepared on lead contamination of soil and vegetation in the vicinity of several secondary lead industries in the Metropolitan Toronto area for the Environmental Hearing Board.

A number of surveys were conducted for the occurrence and incidence of photochemical oxidant (ozone and PAN) injury to farm crops in Southwestern Ontario. An area of approximately one million acres displayed evidence of light to moderate ozone injury on white bean crops under cultivation. The "ozone bronzing" of white bean crops was less severe in 1974 than in 1973. Tomato crops were observed to display peroxy-acetyl nitrate (PAN)-type injury along the north shore of Lake Erie from Harrow in the southwest to the Niagara peninsula in the east.

Several greenhouse and growth chamber phytotoxicology research studies were undertaken to assist in the diagnosis of field-observed vegetation injuries and in the derivation of air quality criteria and standards.

WATER RESOURCES BRANCH

The broad role of the branch is to develop overall water-quality and water-quantity policies, guidelines and criteria to ensure adequate supplies of good quality water for the people of Ontario.

Planning and Co-ordination Section:

The section co-ordinates the planning of major co-operative water resources management studies carried out by regional and head office staff. Specific

technical assistance is also provided for the planning, execution and data evaluation phases of individual studies. Specialized technical advice is made available in the Water Resources Impact Assessment program in such areas as the aquatic environmental impact of marine construction, municipal and industrial wastewater disposal and heated wastewater discharges.

In 1974-75, the Thames River Water Management Study, undertaken jointly by the Ministries of Environment and Natural Resources in 1972, was substantially completed. The need to upgrade water quality, reduce flooding and erosion problems and plan to meet future development are primary challenges facing the Thames River Basin.

The Lower Great Lakes Study is a continuing, cost-shared program with the federal government for the surveillance of water-quality conditions along the Ontario Great Lakes shoreline from Sarnia to Cornwall. During 1974-75, major surveys were undertaken on the St. Clair and Detroit rivers with intensified sampling used to improve the precision of phosphorus loading estimates to assess progress in the phosphorus removal program. Surveys were continued in Lake Erie for a more comprehensive view of recent changes in lake quality. Other activities included sampling of the Duffin Creek confluence with Lake Ontario which has provided baseline data in advance of the proposed development in North Pickering; continued examination of mercury levels in the St. Clair River system sediments; and final drafting of a report on water quality in Wheatley Harbor and Talford Creek.

The Upper Great Lakes Study, continued by international agreement since 1972, involves the section in a number of programs. In 1974-75, five project reports on the findings of surveys in Lake Superior and the majority of survey efforts on Lake Huron were completed.

Limnology and Toxicity Section:

The unit performs a wide range of routine and special studies into the relationships between aquatic organisms and the chemical and physical characteristics of

the water environment.

Last year, aquatic weed harvesting in Lower Chemong Lake continued with 700 acres cut. Research was started at the University of Guelph to find uses for the plants as compost and animal feed.

Lime additions were carried out in the Sudbury Lakes to maintain the pH. It was shown that the addition of calcium carbonate provides long-term stability of the pH while calcium hydroxide gives short-term adjustment. In addition, toxicity studies were continued to determine the long-term effects of metals on fish in the pH-adjusted lakes.

Destratification was carried out in two experimental lakes with considerable improvement noted over previous years in water clarity in both cases.

Also, during 1974-75, an effluent hauling system was built which allows for detailed toxicity testing of industrial effluents from up to 250 miles from the laboratory.

As part of an on-going program, phyto-plankton data was collected from water works intakes in the Great Lakes with results showing decreasing algae in parts of Lake Erie likely due to phosphorus removal programs. A report was prepared on the effects on water quality in Gravenhurst Bay of phosphorus removal at the Gravenhurst Sewage Treatment Plant -- quality was found to be improved with less algae and greater clarity.

Hydrology and Monitoring Section:

The section contributes to the development of policies and guidelines relating to groundwater protection, environmental assessments concerning groundwater, water takings and the resolution of interference complaints. It also co-ordinates and directs the operation of water quality and quantity networks across the province, provides for the assessment and management of inland rivers, lakes and groundwater resources and provides guidance for the use of remote sensing

techniques as applied to geology, hydrology and hydrogeology.

It provides geotechnical support to Ministry hydrogeological and groundwater development programs, technical expertise in examining complex groundwater contamination problems, technical assistance in major drainage basin inventory studies and technical advice for special water resource studies as well as arranging the development of data management systems to handle the interpretation of hydrometric data for water quality and quantity assessment and management programs. It also provides a significant proportion of the Ministry's contribution to the IJC-PLUARG program and administers a program for licensing water-well contractors across Ontario.

During 1974-75, activity was concentrated on regionalizing programs which had previously been administered centrally, and in establishing working relationships with regional staff.

Geotechnical Services:

The prime function of the unit is to provide geotechnical support during the development of groundwater supplies and during investigation of groundwater contamination problems. The unit also develops and evaluates new geotechnical techniques that relate to hydrogeologic studies and provides guidance in the use of remote sensing techniques.

In 1974-75, well logging surveys were carried out in the Lansdowne, Cannington and Duffins/Rouge areas; seismic and resistivity surveys in Wilton Creek, Ernestown, Gravenhurst, Bradford, Sudbury and South Gloucester areas, and a magnetic survey at Sarnia.

Additionally, a fluid resistivity probe was designed for use during down-the-hole well logging programs; a draft report "Case Histories in the Application of Geophysics to Ground Water Problems" was prepared; and ground-truth information was collected during

over-flights of the Bowmanville area as part of a co-operative program with the federal Department of the Environment to study remote sensing techniques to measure soil moisture and snow water equivalents.

Pluarg:

The Pollution from Land Use Activities Reference Group surveys selected watersheds to determine the source of certain pollutants, their significance and the adequacy of present control measures controlling their entry to the Great Lakes system.

In the last year, base networks for monitoring stream-flow and water quality were set up at 65 stations. A hydrologic investigation of a sanitary landfill site in the Township of Ernestown was carried out. The unit participated in discussions by a technical committee with representatives of the federal Department of the Environment in support of studies into the effects of leachates on water quality under the Canada-U.S. (IJC) Agreement.

Groundwater Protection:

The unit develops policies for the prevention of ground-water contamination. It is also responsible for the licensing of water well contractors and the developing of regulations to ensure adequate well-construction practices.

During the last fiscal year, draft guidelines covering the hydrogeologic evaluation of sanitary landfill sites were prepared. Material was gathered on gasoline and salt contamination of wells and aquifers to assist in the establishment of guidelines for better storage and handling methods. Assistance was given to regional representatives in investigation of sanitary landfill sites and in field assessment of groundwater contamination caused by gasoline leakages, salt pile storage and road salting.

Water Quantity:

The unit participates in the on-going program of major drainage basin inventory studies across Ontario. The unit assists in developing uniform policies for water taking and provides technical assistance in special water resource studies to Ministry representatives and other government agencies.

In 1974-75, final editing of the report on "Water Resources of the Moira River Drainage Basin" was undertaken. Field work was completed in the Duffin/Rouge drainage basin and the initial draft of a report was completed. In addition, planning of water resources inventory surveys was initiated in three large drainage basins -- South Nation River in the Ottawa area, Holland/Black basin south of Lake Simcoe, and the Sydenham River basin in Southwestern Ontario. Studies of the three watersheds will be carried on into the early 1980s.

The groundwater probability map for the County of Haldimand was published and work initiated on the publication for Norfolk County. In liaison with the regions, work on a computerized data bank system to store and retrieve information on permit applications, water use and interference problems was begun. Preparation of the final report on the assessment of surface and groundwater resources in Northern Ontario continued. The unit also provided technical groundwater information to the North Pickering Project (NPP).

Hydrometric Networks:

The unit provides guidance for the establishment and operation of water quality and quantity monitoring networks across Ontario, and for the adequate assessment and management of inland rivers, lakes and groundwater resources. It arranges for the collection, compilation, editing, technical scrutiny, uniform processing and dissemination of hydrometric data from these networks.

In 1974-75, a preliminary review of network stations

was made, primarily in Northern Ontario. Arrangements were made for signing of a new Federal-Provincial Hydrometric Agreement dealing with cost-sharing for all surface water quantity stations operated in the province. There was a successful transition of the field data acquisition from a central to a regional operation. The 1974 Water Year Tributary Loadings were completed for both the Upper and Lower Great Lakes for the 1974 Water Quality Board Report to the IJC.

Water Modelling Section:

Lake Systems:

A major achievement was completion of the Hamilton Harbor Study assessing the long-term trends in water quality and examining means of water quality enhancement. A numerical model, utilizing continuously recording chemistry and current data, was developed and used for the first time.

A coastal-zone water chemistry and currents report was prepared as part of the Nanticoke Environmental Study to assess effects of the thermal generating station on Lake Erie waters. Data were provided to the Ministry of Natural Resources to assist in its fish migration studies.

Also in 1974-75, the effluent plume chemistry dynamics for the Domtar mill at Red Rock (Lake Superior) were studied in support of the fish sub-lethal bioassay experiment. A model was developed for estimating the nearshore/offshore exchange of material for the Great Lakes.

River Systems:

With the conclusion of the International Hydrological Decade (IHD) program, efforts were concentrated on the analysis and simulation of the hydrologic data collected in the five representative basins. Data collection activities were continued in support of the section's work in hydrologic model development. A multi-parameter comprehensive watershed model was completed

and applied to the Wilmot Creek representative basin to allow the generation of stream-flow responses to various precipitation events. Analyses of the geologic and hydrogeologic characteristics of the Blue Springs Creek and the Wilton Creek representative basins were completed, all as part of the Ministry's contribution to the IHD program.

Stream water quality models were applied in several watersheds to support the work of the regions in the development of basin water-management policies. Management alternatives and waste assimilative capacities were defined for municipalities in the Thames River, the Middle Maitland River, the Saugeen River and the Ausable River and part of Lake Simcoe. Preparations were made for hydrologic and waste assimilation studies in the Grand River watershed.

To support studies of the Urban Drainage Subcommittee (Canada-Ontario Agreement), assistance was provided in project co-ordination and model development to define the effects of urban storm runoff on receiving water bodies in Southern Ontario.

POLLUTION CONTROL BRANCH

The branch is responsible for the planning and development of policies and programs for the abatement, control and prevention of discharges or emissions of contaminants to the environment and for review and improvement of programs.

The responsibilities of the nine sections in the branch are subdivided in two groups; Policy and Program Development, and Technology Development and Research:

The branch played an active part in the implementation of Part VII of The Environmental Protection Act, participating in administrative arrangements, establishing guidelines and setting up an advisory committee.

Ontario's Contingency Plan for emergency response to accidental discharges of hazardous substances was

revised and the branch continued to work on the development of regional response groups.

A major new thrust in waste management and waste recovery was undertaken in the Pollution Control Branch, with the planning of Watts from Waste, a demonstration project to use garbage as a fuel supplement in power production at Lakeview Generating Station and the development of a Resource Recovery program for Ontario. The Resource Recovery Unit moved from Pollution Control towards the end of the fiscal year to be established as a separate branch within the Utilities and Laboratory Services Division.

POLICY AND PROGRAM DEVELOPMENT GROUP

Municipal and Private Section:

The section assesses the effectiveness of municipal sewage and water supply, promotes sewage and solid waste programs and plans, develops and assists in the implementation of new policies, programs and legislation. It is composed of three units, each with distinct areas of responsibility.

The Municipal Sewage and Water Supply Units made marked progress during 1974-75 on the development of a master computer system to help assess programs in its field.

Activities continued under the IJC Upper Lakes Reference Group in its assessment of pollution problems in Lakes Huron and Superior. There was increased liaison with Environment Canada and Central Mortgage and Housing Corporation in support of their programs in the municipal sewage field.

The Canada-Ontario Agreement progressed through its fourth year with significant progress being made, in co-operation with Environment Canada, in the investigation of new and improved sewage treatment processes. By the end of the fiscal year, 116 sewage treatment plants were undertaking phosphorus removal on schedule.

Major areas of research under the agreement included phosphorus removal, identification and control of pollution from urban drainage and potential pollution and health effects of sewage sludge when applied to crop-producing soils.

Work continued on evaluation of removal techniques for asbestos in water supplies. In addition, studies were initiated to assist in the implementation of the policy requiring treatment of wastewaters originating from water treatment plants.

The Private Sewage Unit worked on the development of Part VII of The Environmental Protection Act, proclaimed in April, 1974. Responsibility for private sewage disposal and the regulations governing these systems passed from the Health Units to the Ministry. The responsibilities for implementation were subsequently delegated by agreement to the Health Units.

The Advisory Committee on Private Sewage Disposal Systems, comprised of representatives from the Ministries of Health, Housing and Environment and the Health Units, was established to effect better co-operation in the provision of adequate sewage treatment for private households.

Regulations, guidelines and supporting administrative procedures covering private sewage disposal systems were published.

Section staff worked with the regions on policy and program development relating to pleasure boats, marinas and ice fishing shelters.

Solid Waste Unit staff continued to work closely with other Ministry branches and the federal government in studies of pollution from sludge application and leachate from landfill sites as part of the IJC Pollution from Land Use Activities investigations.

Work progressed on the development of interim guidelines for the application of sewage treatment plant sludges on food-producing lands. Long-term studies continued

to be carried out at the University of Guelph with emphasis on nutrient availability and effects of heavy metals on soils and crops.

A pilot project in the Timiskaming area was initiated to assess techniques, costs and problems associated with the introduction of a program to collect derelict motor vehicles throughout the province for recovery and reuse of metal components. These studies were required as a prerequisite to a full program.

The Waste Management Advisory Board was created to advise the Minister, with initial emphasis on packaging and refillable containers. The second year of the anti-littering campaign continued with the collection of field data on the makeup of litter and a Data File was initiated.

During the fiscal year, the responsibility for area solid waste planning and waste recovery studies and development was shifted from the Pollution Control Branch to the new Resource Recovery Branch in the Utilities and Laboratory Services Division.

Industrial Section:

The section has as its prime responsibility liquid gaseous and solid emissions to the environment from industrial and institutional sources.

During the fiscal year, the problems of liquid industrial waste disposal and waste oil utilization and disposal were examined. A provincial plan was developed for liquid industrial waste disposal and implementation is proceeding.

A revision of the Model Sewer-Use Bylaw was undertaken jointly with the Municipal Engineers Association with the intention of promoting uniform bylaws within municipalities throughout the province.

A number of guidelines for controlling emissions from industrial operations were prepared. These are intended for the guidance of Regional Operations and Industry to

ensure a uniform approach across the province.

The section provided representation on a number of technical committees. These included a committee established to revise the Agricultural Code of Practice and a Technical Committee of Ontario Feed and Grain Dealers established to review the results of a grain dryer study conducted at the University of Guelph.

An Electrical Power Review and Co-ordinating Committee was established by the section to assist in the development of policy and procedures for pollution abatement and control at existing Ontario Hydro facilities. As a result of the committee's work, Ontario Hydro has agreed to a standardized approach to monitoring and reporting of all aqueous discharges associated with thermal and nuclear generator stations.

Pesticides Control Section:

The Pesticides Control Section promotes a balance between pesticide use and environmental protection. The prime responsibility of the section is the safe use and management of pesticides in Ontario through licensing of exterminators and vendors; through issuance of permits for use; through education of the public with publications and industrial and commercial areas with training course, fact sheets and study guides.

The programs of the Pesticides Control Section are carried out under The Pesticides Act 1973 and Ontario Regulation 618/74 implemented in September, 1974. The legislation incorporates the relevant sections of The Environmental Protection Act and The Water Resources Act. Copies of the new Act were distributed to all licensed exterminators, vendors and operators as well as to all interested groups.

The licensing program which involves providing appropriate study materials, examining applicants and licensing qualified applicants to apply, store, or sell pesticides was continued.

The total number of licenses issued was 9,675. This includes 795 for operators, 4,435 for land exterminators, 516 for structural exterminators, and 3,929 for wholesale and retail vendors.

These licenses were issued under the classification as outlined in The Pesticides Act and Regulation. The system combines several previous classes of land exterminators into one class but subdivided the structural class into two. This is reflected in the numbers of licenses issued this year over those issued in 1973-74.

The total number of permits issued was 322. These permits were issued for the use of restricted pesticides such as methyl bromide and cyanogas as well as for special experimental purposes as directed under The Pesticides Act. In addition, 150 permits were issued for the application of herbicides to nuisance aquatic vegetation in recreational lakes. In this last area, over 1,500 inquiries were handled with respect to problems of lake and pond management.

Guidance and assistance was given to Orillia to initiate a mosquito control program using a larvicide for spring species. This pilot project is described in the report "Mosquito Control, A Larvicide Program for Spring Species: Orillia 1974."

The Education and Information Unit has been active in efforts to co-ordinate study material and publications with The Pesticides Act and Regulation. New courses have been outlined for the classes of water exterminators which are now included under The Pesticides Section supervision, in addition to revision of existing information.

As well, many seminars and lectures were given for various sectors of the pesticides industry, levels of government and general public to familiarize these people with changes in pesticides legislation.

A conference was organized by the Pesticides Control Section in co-operation with the American Association of Cereal Chemists, Bakery Council of Canada, Canadian

Institute of Food Science and Technology (Toronto), Environmental Management Association (Toronto), Grocery Products Manufacturers of Canada, Ontario Milk and Food Sanitation Association to discuss legislation, pest problems and control in many areas of the food industry.

Because of the re-classification of exterminators under The Pesticides Act and Regulation, a special seminar was organized on current research, control methods and status of infestations of termites. The seminar was a qualifying requirement for structural exterminators working on termite treatment.

A Pesticides Symposium was held in co-operation with Landscape Ontario and the Ontario Golf Superintendents Association dealing with aspects of turf management, weed control and insect control on ornamental trees and shrubs.

A course was conducted with The Ontario Good Roads Association for roadside sprayers. New publications prepared this year for general distribution to the public are "Ants," "Carpet Beetles," "European Earwig," "Fleas, Lice and Bedbugs," and "Aquatic Plant and Algae Control." Two reports were published on data collected throughout the year. "Aquatic Nuisance Control in Ontario, 1974" summarizes the use of pesticides as permitted by the Pesticides Control Section for addition to water areas. "Mosquito Control, A Larvicide Program for Spring Species: Orillia 1974" outlines the procedures carried out in this experimental program with the assistance of the Aquatic Nuisance Specialist. One publication was revised and prepared jointly with the Ministry of Natural Resources: "Controlling Mosquitoes and Black Flies in Ontario."

Noise Pollution Control Section:

The section is responsible for the planning and delivery of the Ministry's Noise Control Program in line with previously set priorities. The section researched the control of vehicle noise and the control of stationary noise sources.

A decision was made to give Ontario Municipalities additional powers to control noise at the local level once a new Municipal Noise Control Program was developed. Accordingly, The Environmental Protection Act was amended to provide for noise control and this amendment was given Royal Assent in February, 1975.

In addition, a draft Model Municipal Noise Control Bylaw was prepared and mailed to all Ontario municipalities as well as being widely circulated to the public and to professional and trade associations. Preparations were made to hold a series of regional workshops to explain the intent of the bylaw and to assist municipalities in writing a bylaw and training personnel.

The section's other assigned task was to investigate noise complaints and obtain abatement of specific noise problems while developing an investigatory and abatement procedure for field personnel. In 1974-75 the section investigated 507 noise complaints. About 300 complaints (mostly involving air conditioners) were satisfactorily settled with voluntary co-operation from offenders. Certain cases such as heavy arterial traffic noise and other causes such as blasting, gun shots and drop-forged vibrations proved beyond simple solution.

A special training course in Acoustic Technology for designated municipal personnel was developed with training manuals written by section staff. In addition, the Impact Analysis Unit carried out several transportation (rail, air and road) noise studies that will be used to develop criteria and prediction technique for landuse assessment problems.

Contingency Planning Section:

The section plans, co-ordinates and provides technical consultation for the development of contingency plans and to meet specific problems with accidental discharges of hazardous substances.

The Province of Ontario Contingency Plan for Spills of

Oil and Other Hazardous Materials was developed to final draft stage during 1974-75. The plan, released during the fall of 1975, was co-signed by the Ontario Ministries of the Environment, Health, Consumer and Commercial Relations, Natural Resources, Transportation and Communications, Solicitor General, and the Federal Department of the Environment and the Ministry of Transport. The new plan reflects the improved response capability of the Ministry of the Environment and recent developments in contingency planning in other jurisdictions at the federal and municipal government levels as well as developments in the private sector. The section also prepared publication Supplement I to the Provincial Plan entitled "Information on Commercially Available Oil Spill Containment and Cleanup Equipment" and Supplement II to the plan entitled "Municipal Contacts."

A significant portion of the section's time was allocated to the participation in "Operation Preparedness," a project co-ordinated by Environment Canada which will result in the development of an operational manual for spills on the St. Clair and Detroit Rivers.

Statistics assembled and analysed on the various spills which occur in the province, indicate that 75 per cent of the 525 incident reports received, involve the loss of liquid petroleum products. These spills can originate from stationary sources or from materials in transit by rail, road, water or pipeline transportation modes.

These ranged in size from those of a few gallons of PCB-type transformer liquid to a spill of 100,000 gallons of sulphuric acid and a spill of 100,000 gallons of crude oil. On the basis of volume, the quantity of other hazardous materials spilled is approximately seven times the quantity of oil spilled.

The so-called average oil spill in Ontario involves the loss of 1,890 gallons; this compares closely to figures released by the United States Environmental Protection Agency which indicate an average loss of 1,810 gallons per oil spill.

TECHNOLOGY DEVELOPMENT AND RESEARCH

Co-ordination and Technology Transfer Section:

The section is responsible for research co-ordination, for dissemination of new technology and for control of external research grants.

During the year a Research Advisory Committee was formed reporting to the deputy minister. Made up of representatives from Ministry branches involved in research activities, it reviews and makes recommendations on research policy, programs, resources and priorities, and on meeting the requirements of the new management board research policy.

Wastewater Treatment Section:

The section advances the quality of wastewater treatment. To this end, it performs two main functions -- maintaining and continually upgrading the level of expertise in wastewater treatment technology, and providing advice and assistance to planning, control and operational staff of the Ministry, municipalities and industry based upon the best available technology.

The section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MGD activated sludge plant for use in development research work.

During the year, effort was directed primarily toward commitments to developmental research work under the Canada-Ontario Agreement. Projects were generally aimed at providing means for obtaining wastewater treatment plant effluent qualities beyond processes now available. Specific projects included nitrogen removal, physical-chemical treatment, lagoon upgrading, carbon regeneration, effluent disinfection and effluent polishing. The section became involved with combined and storm sewer flows in studies dealing with quality and quantity determinations and storm-flow treatment techniques.

Technical advisory work was closely related to the achievement of the province's phosphorus removal program. There was also increased activity in the upgrading of effluent quality and problems encountered with newly operating phosphorus removal facilities.

Water Technology Section:

The study on the direct filtration water treatment process was completed and a final Research Report published. A technical paper based on this work and published in the American Water Works Journal, received the AWWA Publications Award for 1974 for the most notable contribution to the science of public water supply development.

The Canada-Ontario Agreement study on the magnitude and types of water treatment plant wastes passed the data collection stage and a draft report was completed in August, 1975.

Work continued on data gathering for the investigation of the microbiological quality of treated water throughout various water distribution systems in the Toronto area. Also involved with distribution systems is an investigation of the occurrence and methods of controlling small animals (snails, nematodes, etc.) in watermains. This study is being carried out at municipalities where foam swab cleaning of watermains is being undertaken.

Further examinations of the use of ozone for water treatment were carried out. A pilot plant was set up at the Smiths Falls water plant to investigate ozonation as an alternative to conventional alum coagulation for the removal of color. The plant intends to continue ozone work using a newly developed ozone/water contactor; section staff will assist in program development and interpretation.

A study on the removal of chrysotile asbestos from raw water supplies was begun. Good removal was achieved on a pilot plant scale following optimization of the conventional water treatment processes. An action plan on

asbestos was devised for the Ministry and the investigation is soon to move to the full-scale water plant stage.

An Ontario-wide survey of the occurrence and methods of removal of chlorinated organics in water supplies was begun.

The dissolved-air flotation process was studied with regard to potable water treatment in place of the conventional sedimentation stage. Difficult-to-settle solids such as certain types of algae could prove to be simpler to treat by this process.

A study into the occurrence of parasite cysts and ova in sewage sludges was begun.

The technical advisory work involved numerous water treatment plant process problem studies at the request of the regional offices or municipalities. These investigations involved such topics as: assisting in the repair of a plugged filter under-drain system at Goderich; cleaning iron-fouled filter media at Moonbeam; assisting in the commissioning of a new plant at Sudbury; total water treatment process review and modification at Ohsweken and expanding knowledge of the sodium silicate sequestering of iron through the investigation of borderline water supplies which are being treated. This relatively inexpensive process is presently being used in installations where the well water quality was too poor to warrant housing expansion in small municipalities without costly treatment.

A substantial portion of the section activities was taken up with the Training & Licensing Program. Staff developed and presented a new course -- Surface Water Treatment Workshop and assisted in the Basic Water Treatment, Basic Sewage Treatment and Gas Chlorination Workshop courses.

Applied Sciences Section:

The Applied Sciences Section investigates and reports

to management on innovative and unusual concepts and processes with regard to their possible application to control and regulation of water supply and treatment, sewerage and sewage treatment and water, air and soil resource use.

During the past year, 18 investigations were under active consideration, six of which were concluded, resulting in the publication of eight project reports.

In response to increased demand for rural and cottage development, with attendant requirements for on-site sewage disposal, eight of the 18 active projects were related to such disposal systems and their impact on the environment.

In addition to the project work, staff are involved in providing consulting services to the Ministry staff. The work resulted in approximately 50 formal memorandum reports.

As part of the regular investigations, a chemical dosing device for home use was devised and is now being patented.

ENVIRONMENTAL APPROVALS

The branch was established on April 1, 1974, primarily to facilitate the process whereby individuals and organizations seek and receive approvals from the Ministry for a range of activities affecting or having the potential to affect the natural environment. The branch has the following responsibilities:

1. The review and approval of applications to the Ministry required under The Environmental Protection Act and The Ontario Water Resources Act.
2. The development of guidelines for acceptable industrial, municipal and private waste disposal systems.

3. Ensuring that environmental safeguards are incorporated into landuse policies and programs of the Ministry.
4. The evaluation at the conceptual planning stage of activities by the ministries of government, utilities and projects funded by the government and related activities in the private sector, which will have a significant environmental impact.

Four distinct sections make up the branch: Industrial Approvals, Environmental Assessment, Municipal and Private Approvals, and Landuse Co-ordination and Special Studies. These four sections have the responsibility to carry out many of the tasks previously done by the Industrial Waste Branch, Air Management Branch, Strategic Planning Branch, Sanitary Engineering Branch and the Waste Management Branch.

Municipal & Private Approvals Section:

The Municipal and Private Approvals Section is responsible for the processing of all applications made under Sections 41 and 42, O.W.R. Act and Part V of The Environmental Protection Act for non-industrial water, sewage and solid waste programs in the province.

The number of applications received under Sections 41 and 42, O.W.R. Act during the 1974-75 year period included 960 applications for approval of water works extensions; 1,474 applications for sewage works extensions, including 29 air applications for a total estimated value of \$387.6 million. This involved some 34 hearings before the Environmental Hearing Board.

In addition, under Part V, Environmental Protection Act, a total of 2,790 certificates of approval for waste management programs were issued which consisted of 594 new applications and the balance involved in the re-issuing of existing certificates as required. At the same time 21 hearings were arranged with the Environmental Hearing Board and eight appeals before the Environmental Appeal Board.

The section also processed 215 claims for grants under The Pollution Abatement Incentive Act; 135 claims under M.O.E. grant programs and 153 claims for eligibility of C.M.H.C. financing.

Industrial Approvals Section:

The section is charged with the responsibility of reviewing applications submitted by industries in Ontario for the approval of all treatment and control facilities designed to prevent the pollution of air, water and land. The approval functions which had been carried out by three separate government groups until April 1, 1974, were thus brought together under one environmental industrial approval agency. The change was welcomed by industry since industrial environmental control projects could now be discussed in total without being broken down into separate categories dealing with air, water, and land disposal problems. Negotiations were further simplified since the approval of each project could now be obtained from one agency. Bringing the three disciplines together represented a rational approach to the environmental control program since it provided continuity and ensured that the solution of a pollution problem in one area (air) did not produce another pollution problem in another area (water).

Regional Activity:

During the 1974 fiscal year, the Industrial Approvals Section reviewed a large number of applications submitted by industries in the Sarnia area where there has been a significant industrial expansion. A summary of all the applications for approvals processed during the 1973-74 fiscal year has been tabulated in Table I. During the fiscal year the section reviewed all applications for grants submitted by industries under The Pollution Abatement Incentive Act, 1970. Under the terms of this Act, industries are allowed a grant equivalent to the provincial sales tax paid on equipment installed for the purpose of abating pollution to air, water and land. A summary of the applications received and grants paid out, is summarized in Table II.(P.20)

Public Participation:

According to the terms of The O.W.R. Act and The Environmental Protection Act, before a certificate of approval can be issued, it is necessary, in some instances, to hold public hearings on applications. Hence some industries desiring approval of extensive land disposal sites and/or wastewater treatments systems which cross municipal boundaries or could have significant environmental effect, may be required to make public presenta-

tions to support their applications before the Environmental Hearing Board. During the 1974 fiscal year, five such public hearings were held before the board. Most of these hearings were held in Northern Ontario and involved mining industries which proposed the establishment of tailings impoundment systems which used land in more than one municipality. A summary of all the hearings held during the 1974 fiscal year is tabulated in Table III.

TABLE I

INDUSTRIAL APPROVALS SECTION

Applications for Approval Processed

	<u>Received</u>	<u>Approved</u>	<u>Cancelled</u>	<u>Denied</u>
Air	1072	1016	126	1
Water	123	76	4	-
Waste	29	25	-	1
Total	1224	1117	130	2

TABLE II

Applications Processed Under

The Pollution Abatement Incentive Act, 1970

	<u>Received</u>	<u>Processed</u>	<u>Grants</u>
Air	226	178	\$1,009,610
Water	150	141	828,650
Waste	3	3	4,880
Total	379	322	\$1,843,140

TABLE III
Public Hearings

<u>Company</u>	<u>Location</u>	<u>Project</u>	<u>Date</u>
Cambrian Disposals Limited	Sarnia Township	Deep Well Brine Disposal	April 26, 1974
Sturgeon Lake Mines Limited	Sioux Lookout	Tailings Impoundment System	May 2, 1974
Great Lakes Nickel Ltd.	Neebing Township	Tailings Impoundment Basin	May 16, 1974
Adams Mine	Kirkland Lake	Tailings Impoundment System	June 17, 1974
Falconbridge Nickel Mines Ltd.	Sudbury	Tailings Impoundment System	August 22, 1974

Environmental Assessment Section:

The Environmental Assessment Section is the administrative unit with the principal responsibility for the development, implementation and co-ordination of the emerging Environmental Assessment Program.

The goals of the program are:

To identify and evaluate all potentially significant environmental effects of major proposed undertakings at a stage when alternative solutions, including remedial measures and the alternative of not proceeding, are available to decision-makers, and

To ensure that the proponent of a major undertaking, and governments and agencies required to approve the undertaking, give due consideration to the means of avoiding or mitigating any adverse environmental effects prior to granting any approval to proceed with an undertaking.

In essence, the Environmental Assessment Program is seeking to inject consideration of natural and human environmental factors into the decision-making processes of proponent and review agencies.

On March 14, 1975, The Environmental Assessment Act received First Reading in the Legislature.

On a continuing basis, section staff are providing technical and policy input to senior management related to the development and implementation of legislation, regulations, and administrative procedures to initiate a formal, comprehensive Environmental Assessment Program.

In the past year this has required the section to:

- commence implementation of the environmental assessment process for major projects of the Ontario Government and its agencies;
- establish a review process and administrative procedures;

- prepare a forecast of resource requirements for the phased extension of the program, and to;
- establish public participation process for planning Ministry projects.

At present environmental assessments are being prepared and submitted to the Ministry on a voluntary basis. On many of these projects, section staff are responsible for co-ordinating the Ministry's review. When environmental assessment legislation is implemented, co-ordination of the viewpoints of other ministries will also be required. Work load will be governed by the volume of projects designated under the legislation, but is likely to be significantly greater.

Section staff provide advice and offer informal consultation on environmental planning matters to other ministries and agencies and to project proponents in the private sector. The activity also involves the representation of the Ministry on various task forces and committees, as directed by senior management. Groups to which staff of the Environmental Assessment Section are assigned are usually concerned with broad or complex environmental management issues or with informal prior assessment of major government planning or project initiatives.

Section staff perform special assignments on complex or unusual environmental issues as assigned by the Ministry executive. Often these tasks involve the analysis and integration of the policy concerns identified by other head office units or by the regions. The function also involves the handling of a large amount of ministerial correspondence.

Land Use Planning Section:

The Land Use Co-ordination and Special Studies Section has two main objectives:

To ensure that environmental safeguards are incorporated into land use policies and programs of all levels of government and the private sector.

To assess environmental management policy alternatives on the basis of constraints imposed by Ontario's socio-economic systems, taking into account competing government objectives.

To achieve these objectives, the section performs three main functions: advisory, co-ordination and research. It advises other government agencies at all levels and the private sector on environmental matters related to land use planning involving, where necessary, other branches or sections of the Ministry. It co-ordinates the Ministry's response to referrals on official plans, Amendments thereto and general land use issues. It initiates or carries out studies on environmental matters affecting land use as well as economic matters as they are related to the environment or control of pollution.

The section participates, as members, observers or technical advisors, in committees and task forces that deal with planning and land use matters, including: Agricultural Code of Practice Committee, Capital Construction, Program Management by Results Task Force, Central Ontario Lakeshore Urban Complex Steering Committee, Credit Valley Conservation Authority Committee, Haldimand/Norfolk Interministerial Co-ordinating Committee, Housing-Interministerial Co-ordinating Committee, Provincial-Municipal Liaison Committee, Inter-Departmental Committee on Regional Government-County Restructuring Program, Simcoe/Georgian Task Force, Visual Environment Committee, Regional Municipality of Waterloo Planning Liaison Committee, Waterfront Development Plan Committee, Ontario Business Incentives Program - Location Committee, committees established under the Canada-Ontario Agreement on The Great Lakes, Various River Basin Study Committees, Niagara Basic Power Users Committees, Co-ordinating Committee on Economic Development - North Pickering Project, Census Data Users Committee, Statistical Data Users Committee.

In its role as the Ministry's co-ordinator on land use planning, the section co-ordinated the reviews of 346 separate referrals during the year, 44 official plans, 249 amendments to official plans and 53 other items

such as Minister's zoning orders, bylaws, subdivisions, etc.

The section monitors the regional comments on Plans of Subdivision. The result of the monitoring indicates that the Ministry recommends against approval for only about 17 per cent of the applications, primarily for reasons relating to the availability and adequacy of sewage treatment and water supply.

A Land Use Planning handbook was prepared and issued to assist staff in the review of land use proposals.

The section carried out studies and prepared papers and reports on a variety of subjects, including: Mobile Home Parks; Demographic Characteristics, Urbanization, Land Uses and Population Projections in the Upper Great Lakes Basin for the International Joint Commission; Alternative Policies for Pollution Abatement, The Ontario Pulp and Paper Industry - an economic study; Statistical Sources Relevant to Social and Economic Aspects of Environmental Problems in Ontario and Canada; Waste Paper Markets in Ontario; An Environmental Forecasting Model.

Early in the year, the section initiated and assisted in the planning of a Land Use Planning Seminar at the University of Waterloo for Regional Operations staff.

utility and laboratory services division

The division combines a key responsibility for the development of water, sewage and waste treatment systems in Ontario with specialized scientific, engineering and technical expertise offering a range of support services to Ministry programs.

A significant expansion of Ministry laboratory facilities permitted the completion of more than one million tests, a 30 per cent increase in analytical activity over the 1973-74 fiscal year. The expansion included the acquisition and operation of some of North America's most sophisticated and accurate scientific equipment, permitting increased exploration of low-level trace contamination.

An accelerated capital works program was mounted to meet pressing demands for water and sewage treatment services in Ontario. The \$127 million capital expenditure on new works in 1974-75 was a record high for the Ministry construction program.

Increasing concern over the rapid growth of solid waste production and the limitations of present waste disposal methods led to a number of measures in waste control and programs in waste recovery. This culminated in a new program of waste management and resource recovery and the establishment of a Resource Recovery Branch in the division.

RESOURCE RECOVERY BRANCH

During the fiscal year 1974-75, the Ontario Ministry of the Environment, in a series of project and program announcements, unveiled a new and comprehensive approach to solid waste management.

The Watts from Waste Program, in co-operation with

Metropolitan Toronto and Ontario Hydro, will recover energy by using municipal refuse as a fuel additive in the coal-fired Lakeview Generating Station. A garbage-processing plant and transfer station is being developed for the project in Etobicoke to process municipal refuse, recovering ferrous metal and combustible fuel.

The demonstration project was followed by the announcement of a new Experimental Plant for Resource Recovery, to serve as a research laboratory in developing new uses and markets for recovered material and energy reclaimed from waste, and a provincial program of financial assistance in the development of reclamation facilities across Ontario. The experimental plant in Downsview is scheduled for completion late in 1976.

The Waste Management staff in the Pollution Control Branch of the Ministry completed the preliminary planning for the comprehensive provincial program early in the fiscal year, covering all aspects of solid waste management, but emphasizing the twin goals of waste reduction and resource conservation.

The program incorporated the major projects already initiated or planned, including Watts from Waste and the Experimental Plant for Resource Recovery together with new financial policies to encourage the development of waste processing plants.

A working group, including Ministry staff experienced in solid waste management, research and construction management, was set up to plan and implement the development of the program to obtain the co-operation of municipalities and industries which might be involved and to carry out the necessary engineering and planning studies.

Effective April 1, 1975, the Resource Recovery Branch

was established to develop and implement the new program for the conservation and recovery of resources with these objectives:

To recover to the greatest degree practicable the energy and material resources in solid waste,

To foster the development of markets for the full utilization of energy and materials recovered,

To provide guidance and assistance in the economic development of integrated waste management systems,

To reduce to a minimum the use of land for solid waste disposal.

Within the new branch, there are three sections:

Program Development Section:

The section is responsible for continuing the Ministry's program of waste management system planning for regions and counties in the province, integrating these area studies into a comprehensive provincial plan for waste management.

Technology and Market Development Section:

The section is responsible for the development and evaluation of waste processing technology and equipment, fostering the development of new industrial processes for wider use of recovered resources, and developing and evaluating technology for collection, transfer and transportation of waste and recovered materials. The section is also responsible for encouraging markets for the economic development of resource recovery from waste.

Project Construction Section:

The section is responsible for co-ordinating the establishment of waste management systems for resource recovery, the construction of provincially-owned facil-

ties and the management of these facilities.

PROJECT CO-ORDINATION BRANCH

The basic role of the Project Co-ordination Branch is to manage, co-ordinate, review and be responsible for all Ministry capital sewage works and water works projects from inception to the completion of construction.

The volume of activity of the Capital Construction Program during the 1974-75 fiscal year is indicated by the following statistics:

Sewage works projects	\$ 95,000,000
Water works projects	32,000,000
Total expenditure:	\$127,000,000
Provincial Projects	
Applications received for new projects	22
Final agreements executed	39
Municipal Projects	
Applications received for new projects	13 -
Preliminary agreements executed	8
Final agreements executed	12
Construction	
Contracts under construction during the year	202
Average contracts under construction each month	125
Contracts tendered	90
Total value of contracts tendered	\$84,190,000
New contracts started	102
Contracts completed	93

The upward trend of construction activity on Ministry projects continued in the 1974-75 fiscal year and the

\$127 million capital expenditure was a record high for the program. It is expected that this trend will continue through fiscal year 1975-76 with capital expenditure exceeding \$140 million.

Project Co-ordination Branch was formed as a result of the reorganization of the Ministry which became effective April 1, 1974, and combined the responsibilities of the former Project Development Branch with most of the responsibilities of the former Project Construction Branch. In addition, it included the Groundwater Development Section.

During 1974-75, the branch included the following sections:

Project Co-ordination Section:

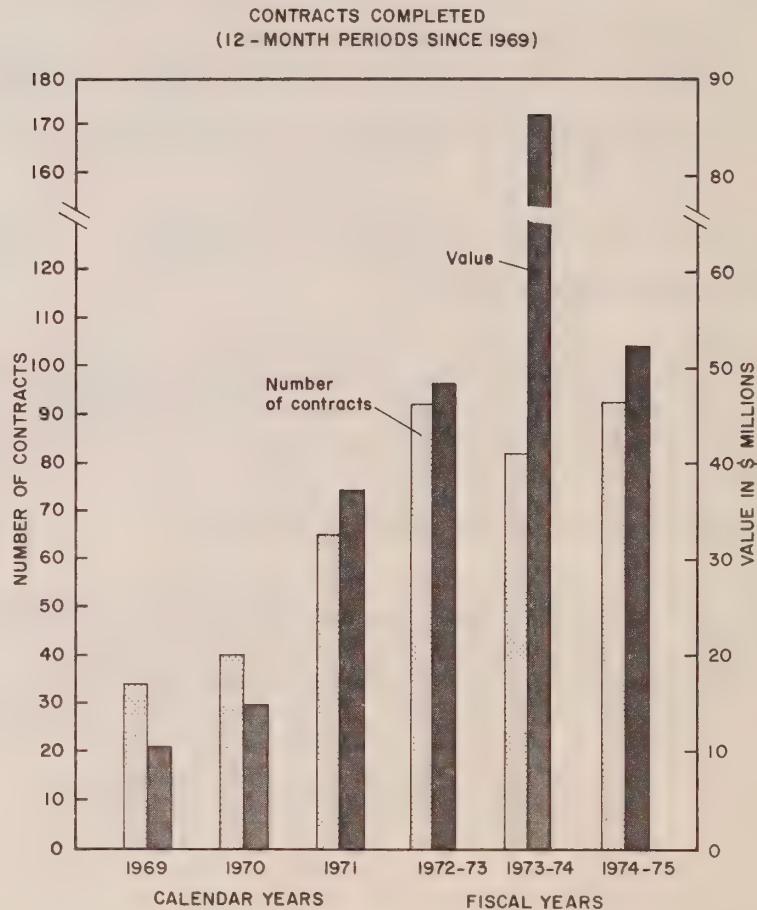
This part of the branch is supervised by the chief engineer, project co-ordinator, who is also assistant director, and comprises six project managers' sections and the municipal project officer's unit. It is responsible for the development and co-ordination of all the Ministry's provincial type and municipal type sewage works and water works projects except for the development phases of large area schemes such as the York/Durham and Halton/Norfolk projects which are the responsibility of the manager, special project development.

The project managers' areas of jurisdiction correspond in general to the six regions administered by the Ministry's regional offices except that, as the project work load varies appreciably between such regions, Project Co-ordination Branch may adjust the project managers' areas to obtain a better balance of project work load.

The project managers maintain close liaison with the appropriate regional offices and with Technical Services Branch in the development of Ministry projects.

A "Management by Results" (MBR) system was introduced

into the Capital Construction Program during 1974-75. By the system, a proposed new project is graded according to certain criteria to ascertain the need for the project and a MBR priority rating is established. As capital funds and staff available are not sufficient to permit all requests for projects to be accepted, the system enables the available resources to be applied to servicing municipalities having the greatest need.

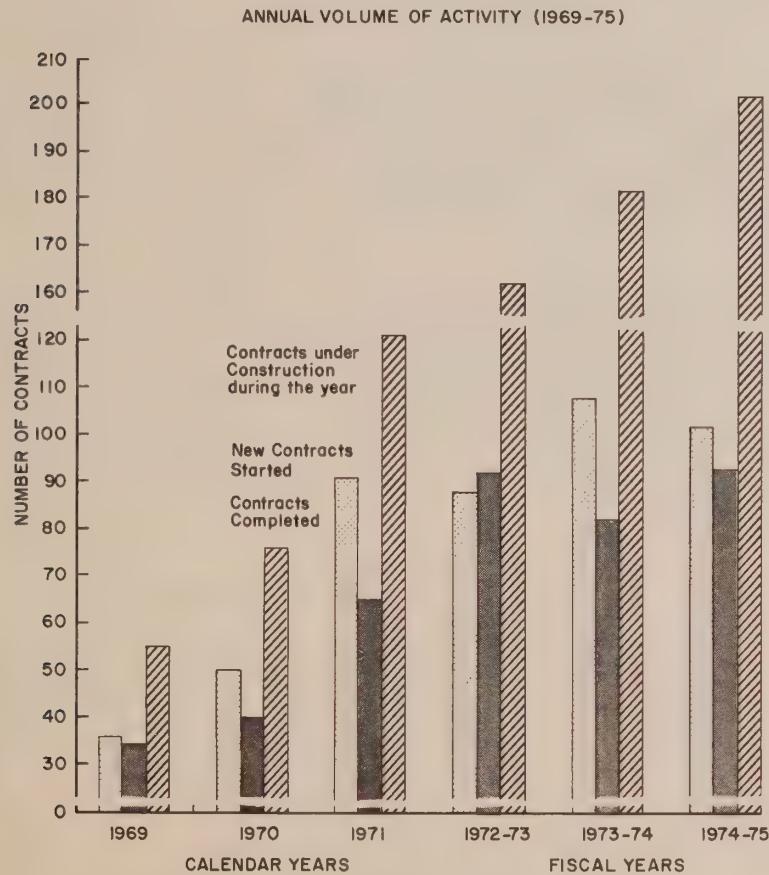


Groundwater Development Section:

The section carries out municipal groundwater surveys and plans and supervises test drilling for water wells

and the construction of such wells for Ministry projects. In addition, it provides hydrogeological expertise in conducting special investigations of groundwater supply problems, leakage problems from sewage lagoons, interference with private wells, etc., in relation to Ministry projects.

During 1974-75, the section supervised 13 test drilling projects and eight well construction contracts with a total contract value of \$632,000. In addition, it undertook 11 groundwater surveys and 11 special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

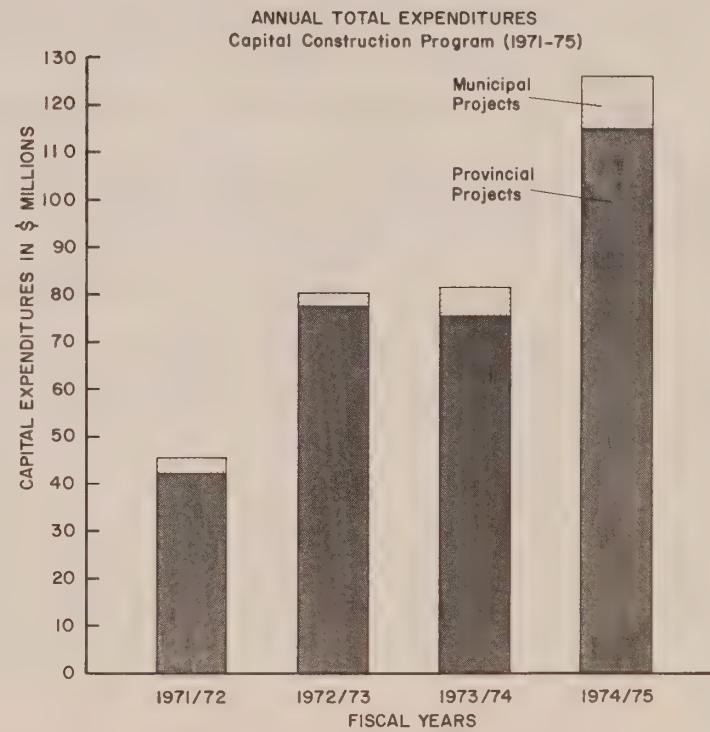


Special Activities Section:

The section provides special inspection of construction, investigation of unusual construction problems, administration of the Ministry's prequalification system for concrete sewer pipe plants, representation on committees involving standardization and co-ordination and numerous administrative and support activities.

Property Section:

The section handles all matters relating to interests



in property for Ministry projects such as obtaining options on property, arranging for the acquisition of necessary easements and purchase of property and administering matters relating to taxation and leases of properties. It ensures that property acquisitions are scheduled to co-ordinate with the requirements of the project managers' sections with respect to environmental

hearings and construction of the works.

During the 1974-75 fiscal year, Property Section arranged property acquisitions for 112 Ministry projects involving 204 freehold purchases and 709 easements for a total expenditure, including related legal and survey costs, of \$3.35 million.

TECHNICAL SERVICES BRANCH

The branch provides the Ministry with a range of technical and operational support services.

Budget Control Section:

The section provided service to the Ministry's expanding capital works program with tender advertisements, tender openings, contract and engineering payments and budget control to provide greater accountability in the management of funds.

Training Certification and Safety Section:

The section organized 38 courses, twice the number offered in 1973-74, offered to 1,537 trainees, an enrolment increase of 300 per cent over previous years. These trainees included 830 Ministry staff, 470 municipal employees, 153 employees from industry, 47 from other government ministries and federal agencies and 37 from other provinces.

The section's activity included training of provincial officers in the identification of visible emissions, the development of guidelines for provincial certification of water and wastewater treatment operators, and planning a program for the certification of municipal noise control officers. In addition, safety training officers made 300 visits and conducted eight on-site St. John Ambulance first aid courses for 100 treatment plant staff.

Design and Equipment Section:

The section evaluates and approves all engineering design work submitted by consultants on Ministry-financed sewage and waterworks projects, reviews process and hydraulic designs and equipment selection for these projects. Staff also prepares design guidelines and standard equipment specifications for Ministry projects, assesses the performance of existing treatment systems and publishes an annual report for each treatment plant outlining performance and operating costs.

The Cartography and Drafting Section:

A 60 per cent increase in demand for services was the result of the section's expansion to serve all Ministry programs. In addition to supplying maps, drawings, figures, diagrams, graphs and other art work, the section was responsible for producing 12,951 reproduction items and 10,350 copies of various maps.

Field Services Section:

A team of technical specialists skilled in the maintenance and operation of electrical diesel and heavy machinery and related instrumentation and controls, provided assistance in 705 operational situations. Their services also included the evaluation of new equipment, some field engineering and modification and final inspection of complex capital works.

Instrumentation and Marine Section:

The section maintains, calibrates and evaluates ambient air monitoring instruments used by the Ministry throughout the province and schedules, operates and maintains water survey vessels of the larger type operating on the Great Lakes for the Ministry.

The Instrumentation Group, working in close co-operation with the Air Resources Branch and the Regional Operations Division, has been able to maintain, repair and calibrate air monitoring units on a regular basis.

The Marine Group operating five survey vessels ranging in size from 20 feet to 56 feet, requiring three licensed masters, put in over 1,600 hours operating time during the season May to December, 1974. Water Resources survey crews were able to sample over 5,100 survey stations.

The year was highlighted by the acquisition of a twin screwed, specially designed, 56-foot survey vessel launched in March, 1975. Christened the "GUARDIAN NO. I," through a Ministry-wide contest, in May, 1975,

she replaced a chartered vessel for the 1975 survey season.

LABORATORY SERVICES BRANCH

The branch provides the analytical data and scientific expertise to support the Ministry's environmental assessment, abatement and enhancement programs. With the increasing number of newly discovered pollutants -- many of which are toxic to aquatic life, damage vegetation, or are potentially detrimental to human health -- the laboratory also provides a much needed early warning system to alert the public concerning the presence of these harmful substances in the environment.

Various individual laboratories are grouped into five main sections: Water Quality, Air Quality, Organic Trace Contaminants, Inorganic Trace Contaminants and Microbiology.

Programs:

The Ministry's environmental assessment and control programs necessitate continuous monitoring of air and water quality throughout the province. The bulk of the laboratory work load stems from these on-going activities. The Air Quality laboratory, for example, completed analyses and a data summary of heavy metals in air particulate matter collected during a three-year survey at twenty-five representative sites. The atmospheres of 11 urban communities including those in industrialized areas of the Niagara Peninsula, were analyzed for the presence of potential carcinogens. A diagnostic service was also provided to identify the composition of complaint samples submitted by the public or Ministry inspectors. Staff provided expert evidence to substantiate their findings when these matters were referred to the courts.

The Water Quality and Microbiology laboratories provided analytical support for lake and stream surveys, drinking

water quality assessment, sewage and water treatment plant control, industrial abatement surveillance, and Upper and Lower Great Lakes water quality monitoring activities. For some of these activities, mobile laboratories were used in order to obtain more accurate data. The hundreds of thousands of analytical tests carried out by these laboratories provided the basic information for assessing the overall quality of provincial waters and gauging the effectiveness of preventive measures and treatment procedures initiated by the Ministry.

The Inorganic Trace Contaminants laboratory concentrated its efforts in analyzing water, sewage, sediment, fish and industrial waste samples for a wide range of metals. Of particular interest was the expanded mercury monitoring program, the heavy metals investigation arising from the Sudbury Environmental Study, and the survey of concentration of metals in fish from the Toronto Harbor.

The Organic Trace Contaminants laboratory carried out tests for pesticides, polynuclear hydrocarbons, polychlorinated biphenyls and derivatives of these compounds. A highlight of the laboratory's activities was the speedy development of new test procedures for measuring the concentration of chloroform and other haloform compounds in drinking water supplies.

Research & Development:

Over the past few years medical research has revealed that trace amounts of substances hitherto considered harmless can have a detrimental effect on human health. These discoveries have created a demand upon the laboratory to develop a wider range of test procedures with improved precision, accuracy and sensitivity, and consequently the laboratory scientists devoted a considerable amount of time to method development work in order to achieve these improvements.

Since it is vital that the analytical data being generated is as accurate as possible, a formalized Quality Control Program has been integrated into the routine

analytical procedures. A quality assurance officer works full time at ensuring that the analytical results meet the prescribed standards.

During the year the results of a number of investigations concerning environmental phenomena were published by staff in scientific journals or presented at conferences. By devoting a fixed segment of time to analytical method development work, quality control requirements and research projects related to environmental problems, the laboratory has been able to maintain the analytical capability to monitor newly emerging pollutants and smaller concentrations of the more commonplace pollutants.

Technology:

A new laboratory wing was constructed and occupied during the year. The new facilities feature a series of diagnostic instrumental systems which provide the capability of isolating, identifying and quantifying pollutants of concern to the Ministry and the public at large. The gas chromatograph-mass spectrometer-computer system is capable of rapidly identifying organic compounds at trace levels. Whereas formerly weeks or months would have been required for this identification work, the new equipment can provide the information within hours. A spectrograph has also been installed which is capable of simultaneously detecting and measuring the concentration of virtually all metals present in environmental samples.

A new capability has been provided for analyzing asbestos and viruses. The acquisition of transmission and scanning electron microscopes has provided this much needed analytical depth to the Ministry. These instruments, together with the existing X-ray equipment and scintillation counter, are key tools employed by the physical laboratory to determine by non-destructive techniques particulate materials and mineral fibres.

The Laboratory Services Branch carried out close to 1.1 million tests during the year, 30 per cent more than the previous year, with virtually no additional staff.

In large measure these productivity achievements were brought about by a combination of automating manual procedures wherever possible, by acquiring new equipment, and the introduction of efficiency measures by staff.

As a result of these operational improvements, together with the completion of the new laboratory wing, the Ministry's analytical facilities are now among the best available in Canada.

regional operations division

The fiscal year 1974-75 marked the beginning of a new era in the Ministry as, under reorganization, the regional operations division was formed and offices were established throughout the province.

The division is responsible for policy implementation and the delivery of Ministry service to the public. This includes environmental protection services such as abatement programs and complaint investigation, regional environmental assessment activities and the operation of sewage and water projects.

The division is divided into six regions: Northwestern (with headquarters in Thunder Bay), Northeastern (Sudbury), Southwestern (London), West Central (Hamilton), Central (Toronto), and Southeastern (Kingston). These central offices are supplemented by district offices across the province.

In each region, programs are carried out by four sections: Industrial Abatement, Municipal and Private Abatement, Technical Support (environmental monitoring and planning), and Utilities Operation.

As is usual with the introduction of any new program, the first year presented some challenges. The combining of three work areas -- air, land and water -- into a single area of responsibility meant making all staff familiar with the full scope of the new work load. In addition, a certain amount of relocation and addition of new personnel were required. However, by the end of the year the necessary adjustments were well underway.

The training of personnel will continue to have a high priority if a comprehensive service is to be provided to the public and industrial sectors. Field personnel must have confidence in their ability to deal properly with questions affecting all aspects of environmental protection.

Industrial Abatement Section:

The Industrial Abatement Section in each region is responsible for the protection of the environment from emissions from industrial processes, including commercial, institutional and agricultural operations, construction and demolition activities, and from certain activities of individuals.

The section makes preliminary investigations into a wide range of environmental complaints, initiates abatement action (control orders or prosecutions) as required and refers problems outside its jurisdiction to the proper authority. It also provides information to industry and to the public on current technology for controlling pollution sources, for process changes when expansion is anticipated and for the disposal of hazardous wastes.

Abatement programs are normally negotiated on a co-operative basis. Where court action is necessary, the gathering of evidence can mean weeks of painstaking work by specially trained field personnel and the use of sophisticated monitoring devices and physical and chemical analysis.

In the six regions, in addition to complaint investigation and survey and abatement activities involving minor industrial sources, Industrial Abatement staff spent a considerable amount of time in investigating, surveying and abating more than 125 major industrial sources.

During the year, the sections also dealt with 30 significant new sources, ranging from auto plants, through mining and pulp and paper operations to a new Ontario Hydro project.

In connection with Ministry control and abatement orders and programs, industrial sources in the province

spent or committed \$142 million in capital funds for pollution control.

A significant factor affecting the progress in meeting abatement schedules has been the delays in delivery of major pollution control equipment. Taking this into account, most of Ontario's major industries are making satisfactory progress in pollution control.

In addition to their other activities, industrial abatement sections provided a 24-hour first-line engi-

neering assessment and co-ordinating function under the Ontario Contingency Plan for 719 accidental spills of oil or other substances hazardous to the environment.

As Table 1 shows, the number of complaints received and investigated in 1974-75 totaled 7,642, most of them concerned with odour, smoke or emission of particulate or dust. Seven hundred and nineteen spills were investigated and dealt with. Farm visits under the Certificate of Compliance Program totalled 498.

Table I
MINISTRY OF THE ENVIRONMENT
SUMMARY OF INDUSTRIAL ABATEMENT ACTIVITIES
For The Fiscal Year 1974-75

	Northwest	Northeast	Southwest	Southeast	Central	W. Central	TOTAL
Number of Complaints	407	649	1142	476	3649	1319	7642
Control & Amending Control Orders	1	2	5	0	3	16	27
Program Approvals	2	0	10	0	3	3	18
Minister's Order - API	0	8	0	0	0	8	16
Farm Visits - Certificate of Compliance Program	1	0	200	103	56	138	498
Spills	51	92	133	172	210	61	719
Court Cases	2	4	5	5	17	7	40
<u>COMPLAINTS</u>							
Odour	92	360	474	127	1472	423	2948
Smoke	43	66	202	79	1216	311	1917
Particulate/Dust	167	95	248	65	729	289	1593
Agricultural	3	0	98	12	46	91	250
Noise	17	26	69	60	58	26	256
Water	82	102	47	47	114	39	431
Other	3	0	4	86	14	140	247
<u>CAPITAL COSTS FOR INDUSTRIAL ABATEMENT</u>							
Millions of Dollars	9	41	23	3	42	24	142

Municipal and Private Abatement Section:

The section is responsible for the field program to protect the environment from the activities of municipalities and private citizens. Specific responsibilities include inspection of water works, waste disposal sites, marinas, boats, ice shelters, water wells, derelict vehicle sites, septic tank systems, holding tanks and sewage treatment plants and pesticide application, storage and sales to ensure compliance with The Environmental Protection, The Ontario Water Resources and The Pesticides Acts.

The Water Works Inspection Program is aimed at ensuring a safe and good quality water supply for the citizens of Ontario. In its first year of operation (1974-75), 1,172 inspections were carried out. A further aspect of the Water Supply Protection Program is the inspection of new wells. During the year, field staff visited 7,256 installations.

The control of sewage inputs to the water environment involves several programs including the inspection, promotion and approval of communal sewage treatment plants, approval of septic tank systems, inspection of boats and marinas regarding disposal of sewage from holding tanks, checking ice shelters on lakes in winter and control of pesticide applications to water.

During the year, 1,101 inspections were made at the 651 sewage works in Ontario, 10,359 surveys of septic tank facilities and 2,438 checks of pleasure craft and marinas. To determine the effectiveness of pollution control measures and locate systems not listed, staff undertook 204 municipal pollution surveys. In addition, an intensive Cottage Pollution Program covered 6,085 cottages, the purpose being to detect malfunctioning systems.

The Waste Management Program entailed inspections of 2,865 sites and systems. It includes approval, inspection and promotion of sanitary landfill sites, incinerators, processed organic waste disposal sites and systems,

and derelict motor vehicle sites. The major thrust of the program is to bring about the development and approval of new waste facilities and then close down inadequate sites. In the processed organic waste, stringent guidelines have been established. A new program of assessing the applications of sewage sludges to agricultural land was started during the year.

Complaints received from the public are valuable in detecting violations. During the year, 3,553 complaints were received and investigated.

In the planning field, staff worked with planning authorities regarding water and sewage facilities on 1,550 proposed subdivisions, 14,172 lot severances, and official plans and their amendments. This is important as it ensures required works are installed as the development is being built rather than after pollution or water problems are encountered.

Technical Support Section:

The section of the Regional Operations Division was established to provide monitoring, analyses, data evaluation, logistics support, environmental assessment, approvals and planning functions for the six regions. Four subsections make up the working units: Approvals and Planning; Air Quality Assessment; Water Resources Assessment; and Laboratory.

Air Quality Assessment:

The subsection is responsible for the air quality surveillance network and assessment of ambient air quality in the region. Current networks consist of 222 continuous analyzers, 165 hi-vol stations, 308 dustfall stations and 381 sulphation and fluoridation stations, including 11 Air Pollution Index (API) stations. In addition, all vegetation and soils evaluations are carried out by the two northern regions, while all phytotoxicological investigation in the southern regions are carried out by the Air Resources Branch.

Among the major activities carried out by regional staff are snow sampling programs, advice to outside agencies operating their own monitoring networks, co-operation with U.S. authorities on trans-boundary problems, presentation of technical papers at conferences and special studies on asbestos, sulphur dioxide, lead, mercury and other heavy metals.

Water Resources Assessment:

The regions operated and maintained a network of water quality and quantity stations totalling 170 stream-flow stations, 684 water quality stations and 319 observation wells. Some major studies included:

- Thames River Basin Study
- Sudbury Environmental Study
- Recreational Lakes Studies
- Nanticoke Environmental Study
- Lake St. Francis Survey
- Humber River Survey
- Rouge River Study

In addition, staff carried out waste assimilation reviews, landfill evaluations, investigations into water quantity interference problems and groundwater complaints. Fish kill investigations and evaluations of deep-well disposal of industrial wastes were also undertaken by regional staff.

The withdrawal of water from streams, lakes, ponds and wells is regulated by a permit program to ensure that withdrawals do not harm the environment or cause hardship to neighboring water users.

Approvals and Planning:

The Regional Approvals and Planning staff deals with less complicated approvals and head office is responsible for more complex approvals including multi-source installations.

During the past year, regional staff issued 578 Certifi-

cates of Approval (Air), evaluated 96 applications for head office and issued 480 Water Taking Permits. Studies were made of 295 official plans (and amendments), 1,297 subdivisions, and 179 water and sewage works.

Laboratory Services:

All laboratories experienced substantial increases in work load in both microbiology and chemistry.

Laboratory	Microbiology		Chemistry	
	Samples	Tests	Samples	Tests
Kingston	5,020	15,787	4,057	16,893
London	11,608	39,382	13,961	118,048
Thunder Bay	7,620	22,899	7,042	51,806

Utility Operations Section

The section is charged with the supervision, regulation and operation of water and sewage works constructed by the Ministry under agreement with the municipalities served. The older projects were built under provincial-municipal agreements and the capital debt charges and operating costs are recovered quarterly from the municipalities concerned. These projects will revert to the municipalities at the end of the respective loan periods. The newer projects are provincially-owned and water or sewage disposal service is provided to municipalities on a rate per thousand gallons basis. The rates are calculated to recover the capital debt charges and cost of operation and are based on twenty year flow forecasts. The expenditures and revenues at each project are kept completely separate and there is no transfer of charges or revenues between projects. As of March 31, 1975, there were 219 such facilities (75 water and 144 sewage) operating in 218 municipalities and 7 industries requiring a total of 445 plant operators on staff. The total capital cost for these

projects is approximately \$600,000,000. Figure 1 shows the growth in the number of projects operated by the Ministry for municipalities.

The Utility Operations staff in each region is familiar with plant and systems engineering, building and equipment maintenance, water and sewage treatment process control, budgeting and cost control, and maintain a close liaison with consulting engineers, equipment suppliers and Ministry personnel in associated disciplines. The group is involved in the initial setting of rates for provincial projects and in the alteration of these rates when circumstances dictate. Close co-operation with participating municipalities is achieved through Local Advisory Committees. The group monitors plant and equipment performance closely and initiates expansions.

Fig.1 PROJECTS IN OPERATION

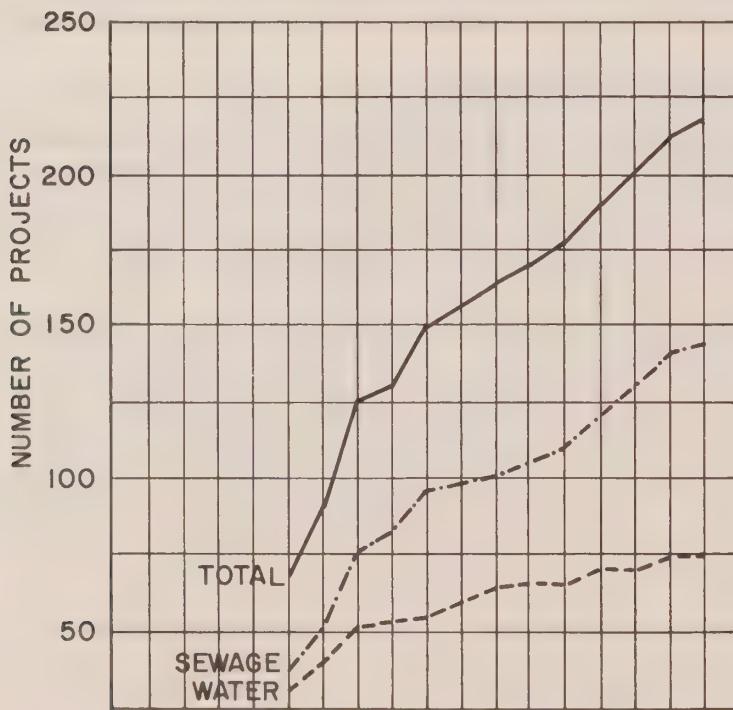
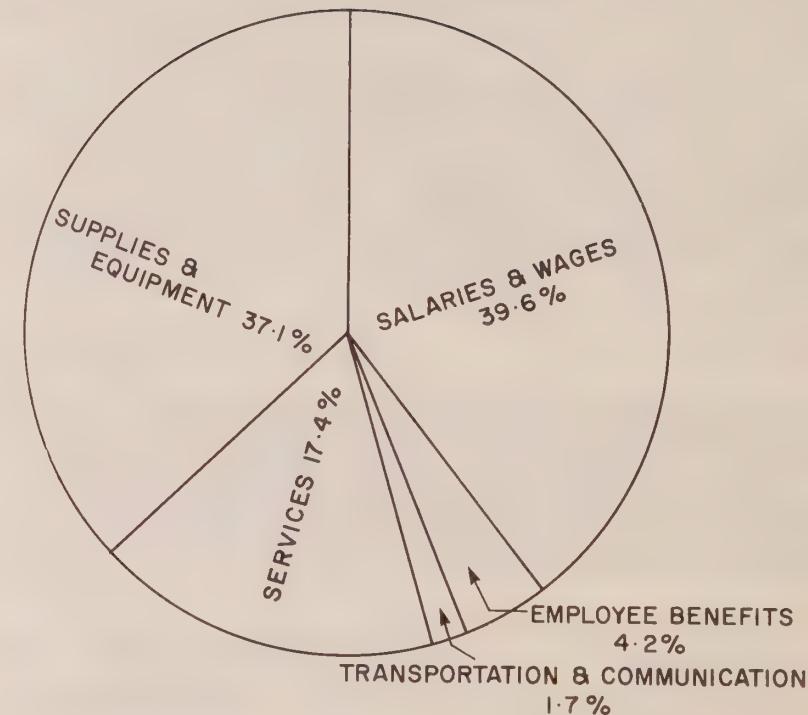


Fig.2

DISTRIBUTION OF OPERATING COSTS



finance and administration division

The Finance and Administration Division is the Ministry's central agency with extensive responsibilities in three general areas: service, control and co-ordination.

Services provided by the division to the Ministry, to staff and to the public include public information, legal advice and action, employee counselling, payroll preparation, systems development and other administrative activities.

The division's control functions include proper classification of jobs in accordance with Civil Service Commission's standards, allocation of accommodation in accordance with Ministry of Government Services' standards and limiting expenditures to the levels set in the annual estimates approved by the Legislature.

Co-ordination activities involve liaison with central agencies on the multi-year plan, the procurement of accommodation, staff recruitment and other functions.

The year 1974-75 was one of consolidation following the reorganization of the Ministry into a regional structure to improve its service to the people of Ontario. This, in itself, required considerable attention to the relocation of staff and accommodation, staff training and retraining and some innovations in public information.

Improved financial controls and strict attention to purchasing practices during the year reflected increased government concern about inflation and increased costs.

A major analysis and assessment of the Ministry's major capital spending was completed and new planning and control systems were established for capital programs.

In general, the division concentrated on providing more efficient and effective support to the Ministry's programs and activities consistent with the new demands stemming from regionalization.

ADMINISTRATIVE SERVICES BRANCH

The Administrative Services Branch underwent a period of consolidation intended to improve productivity. This enabled the branch to increase volume and expand its scope of services despite a reduction of staff. Continuing inflation coupled with more stringent controls by Central Agencies resulted in substantial work load increases in Purchasing. Although the number of purchase orders decreased to 14,000, the dollar value of \$14 million was 12 per cent over the previous year.

Laboratory-Operating Services Section:

The upgraded handling facilities of the new laboratory building enabled the section to deal effectively with an 18 per cent increase of samples received, from 151,630 the previous year to a total of 179,316 in 1974. The increased volume is significant since the higher number of samples was dealt with with no increase in resources.

Assets Control Section:

The Assets Control Information System has been in operation for a full year. All of the year's major acquisitions, about 7,000 items, have been recorded and indexed. Plans are under way to carry out physical inventories of various Ministry locations and update the system during fiscal 1975-76.

Systems and EDP Section:

The System's function was active in a number of areas in the Ministry. Branches in conjunction with system development resources defined their information requirements, conducted feasibility studies, designed, programmed, implemented and operated systems. For example:

The Air Resources Branch provided data for the Lead Task Force on airborne lead near Toronto area

lead smelters, expanded the Urban and Regional Atmospheric Simulation Model to include the Niagara Peninsula, and established the special pollution source inventory of actual emission data for the Sarnia area.

The Water Resources Branch reviewed sample information processing needs with respect to the Great Lakes, River Basins and other sampling programs and began development of the new Sample Information System. Conversion of back-log data will make available for analysis eight previous years of data on approximately 150,000 samples and two million tests. The Water Resources Branch also used the Lake Dispersion Model, the Water Quality Simulation Model and the Hydrologic Model in carrying out a number of studies.

The Pollution Control Branch developed the Industrial Water Pollution Monitor Module to process data submitted by companies on their discharges to receiving waters. At present 73 companies are reporting daily, weekly and monthly loadings. There was continued development on the Utilities Requirements Module to facilitate long-range planning of water and sewage plants. The branch also reviewed their pesticides information processing needs and began development of an automated system. The first module associated with Pesticides Licence Control was developed and is now in operation.

The Laboratory Services Branch assessed benefits and cost of automating various information processing functions, defined its systems requirements and developed detail systems and processing specifications for future development of a Laboratory Information System.

Office Services Section:

As a result of reorganization within the Ministry, the section has substantially improved the quality of its services. Records and Forms Management Section has

taken an inventory of all Ministry files and produced new file plans as well as developing a Forms Management Program designed to improve, simplify and reduce in number, government forms. Mail and Messenger Services has continued to provide service to head office and the regions despite mail strikes and increased work load.

Approximately 3,200 requisitions, totalling some ten million impressions, were processed by the in-house printing facilities with production efficiency up 20 per cent over last year. Contents of the Ministry's Procedures Manual have been updated to meet the requirements of organizational changes and distribution of the new material was undertaken in April, 1975. Office Services was heavily involved in providing field office accommodation for regional staff and in the consolidation of head office locations.

Library:

The Library Services' holdings expanded. During the year, the libraries subscribed to 350 journals, acquired 3,241 books, and provided computer searches of other libraries' book holdings to obtain information and research material. The libraries loaned 9,293 books, answered 2,710 reference questions and circulated 14,251 periodicals.

FINANCIAL SERVICES BRANCH

During 1974-75 the Financial Services Branch was reorganized into five sections. Imprest bank accounts were established for each regional office to provide for emergency expenditures.

Accounts Payable Section:

The section combines the invoice verification and requisitioning functions. Over the year the work load increased 12 per cent to a total of almost 76,000 invoices and claims.

Appropriation Control and Data Preparation Section:

The prime responsibility of the section is to ensure that budgetary allocations approved by the Legislature are not exceeded.

In addition, they determine that invoices are properly authorized and charged to the correct appropriation. They also produce monthly financial reports for Ministry management.

Accounting Records and Control Services:

The section is responsible for maintaining records on a cash and accrued basis for plant construction and operation and various subsidiary records. Other functions include payroll audit, cheque distribution, and receipt and custody of cash.

Payroll Section:

Responsible for the processing of all payroll information from Personnel records, the section shared with Personnel the implementation of the Integrated Payroll/Personnel Employees Benefits System.

Capital Financing and Revenue Section:

The section handles the financial management and reporting on the Ministry's utility activities, subsidy programs and cost-sharing agreements. During the year, 47 water and sewage works were completed and capitalized bringing the total to over 600 completed municipal and provincial projects. Fifteen rate reviews were completed for provincial projects. Financial requirements were prepared for Part VII, Environmental Protection Act, and considerable staff time was devoted to the Niagara, York/Durham and Haldimand/Norfolk regional water and sewage works financing.

INFORMATION SERVICES BRANCH

The branch provides a comprehensive communications service to the Ministry and is responsible for the development and implementation of communications activity supporting the Ministry's programs.

Major thrust of the branch in 1974-75 was directed toward the Ministry's regionalization program and included an Ontario-wide advertising campaign to inform the public of the establishment of Ministry regional and district offices and of the range of services provided on a local basis. As a second phase of the campaign, a series of public service announcements was produced and distributed to T.V. and radio in each region.

Special projects included the development of two major display booths -- Water Management, incorporating a cutaway simulation of a floating test laboratory; and Resource Recovery, featuring a working model of a primary process recycling plant. These booths were introduced respectively at the 1975 Canadian National Boat Show and at the Canadian National Exhibition.

During the year in review, the Ministry was represented in seven major exhibitions and in 25 regional fairs. An estimated 500,000 people visited Ministry booths in the total 32 exhibits. More than 1,000,000 litter bags and promotional badges were distributed as part of the Ministry's information program.

A comprehensive review of Ministry publications was completed in September, 1974. As a result, several obsolete publications have been discontinued, others have been updated and reprinted and new publications have been planned for development and production. These include a range of economically produced "Fact Sheets" and a series of brief brochures under the general title: "Who Cares about our Environment."

At the beginning of the year a total of 15 different publications, exclusive of technical reports, were in circulation. At year's end a total of 50 publications

were available to the public. During the year a total of 1,500,000 Ministry publications, including technical reports, were distributed.

While the project was not completed until August, 1975, the branch initiated and arranged production of a special film -- "Women in the Environment" -- as a special Ministry project commemorating International Women's Year.

Another project launched in 1974-75 was the introduction of an "Envirovan," a mobile environmental information centre to be used in the Ministry's educational activities among students of all ages. More than 3,000 teachers and students throughout the province participated in seminars and demonstrations conducted by branch members. It is anticipated that effective use of the Envirovan will expand the program in future.

The branch worked with regional staff to introduce the regional director and local services to the media and the public on a regional basis. Increasing emphasis was placed on local publicity for regional Ministry activities and accomplishments.

LEGAL SERVICES BRANCH

Legal Services Branch remains in residence and very much a part of the Ministry's day-to-day activities despite a government reorganization that has incorporated branch staff into the Ministry of the Attorney General. The change, in effect, recognizes that the branch serves the Ministry in the same way a solicitor serves his client.

A primary function of the branch relates to the responsibilities of the Ministry for enforcement of The Environmental Protection Act, The Ontario Water Resources Act and The Pesticides Act. During the past year 63 charges were before the courts at some stage. In the resulting convictions, fines ranged from \$50 to \$7,000.

The branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence and provides counsel to present these cases in court. The Ministry operates under relatively new legislation which is still being tested in many ways in practical application and the process of testing in the courts is a valuable part of assessing and improving Ontario's environmental legislation.

Staff of Legal Services Branch serve as counsel, guiding the Ministry's presentations in proceedings before the Environmental Appeal Board, and other hearing agencies.

Other legal services include advice on the appropriate application of the Ministry's powers, on the form of documents and on a variety of orders which can be and are issued by Ministry directors under the existing legislation.

The branch also provides legal advice to the operating branches and prepares Orders-In-Council, regulations, contracts and orders.

PERSONNEL BRANCH

The Personnel Services Branch directed much of its effort during the year to assisting in the reorganization of the Ministry. The reorganization entailed extensive documentation relating to job descriptions, organization charts and distribution of employee information to managers.

The Ministry was one of three ministries chosen by the government for the introduction of a new program by which Payroll, Personnel and Employee Benefits information is to be integrated into a single file for each employee. This provides for greater efficiency in the processing of transactions affecting employees within the organization.

Staff Development:

The reorganization of the Ministry resulted in a greater need for certain management skills than in the past. To this end management development courses were developed to provide particular relevance to the Ministry's programs. In addition, the branch co-operated with Regional Operations in a new program of goal setting and review.

In recognition of the specialized function carried out by some professional staff in inspection and abatement, a new job class, environmental technician, was provided in the Ministry.

Recruitment:

A higher rate of turnover than usual in early 1974 coupled with a consciously diminished recruitment activity prior to the reorganization resulted in a stepped-up recruitment program after the reorganization. During the year, 364 new employees joined the Ministry and 239 left. By March 31, 1975, the number of vacancies had been reduced to 88 from a high of 250 the year before.

PROGRAM PLANNING AND EVALUATION BRANCH

The branch conducts operational and policy evaluation studies relating to Environmental Planning, Environmental Control, Resource Recovery and Administrative Support Services. Its two primary goals are to ensure a rational allocation of available resources to programs and to assess program effectiveness and efficiency.

The branch develops the Multi-Year Plan from conceptual stages to the annual estimates and acts as liaison with Policy and Priorities Board, Resources Development Policy Field Committee, Management Board, and other control agencies.

Among its accomplishments in 1974-75 was the completion

of a major analysis and assessment of the Capital Construction Program. In addition, the branch established Management-by-Results systems as bases for planning and control of the Capital Construction and the Resource Recovery Programs; refined the program structure to emphasize the Ministry's role in environmental protection, and co-ordinated manpower studies to improve efficiency.

INTERNAL AUDIT BRANCH

The branch was primarily engaged in the performance of finance-oriented audits, including review of the adequacy of procedures and internal controls. Operational audits were carried out in specific areas and upon request. New procedures and controls were reviewed with staff of other branches with the objective of protecting the integrity of Ministry control functions.

boards and commissions

The Environmental Hearing Board

The Environmental Hearing Board, under the authority of The Ontario Water Resources Act and The Environmental Protection Act, this year conducted numerous hearings in communities where sites were designated for sewage treatment and landfill operations. Reports were submitted to the Ministry on 31 hearings concerning sewage treatment sites and 14 dealing with proposed landfill operations.

In addition to its regular hearings, the board, under the chairmanship of D.S. Caverly, was authorized by an Order-in-Council to hold special hearings concerning trans-boundary air pollution between Michigan and Ontario, the Thames River Basin study, lead contamination in the Metropolitan Toronto area, and environmental implications of the Fisher Harbor development.

Recommendations of the board contained in the reports of the hearings were based on the evidence presented at the hearings and its assessment of whether the proposals were in the public interest. These recommendations included approval, approval with suggestions offered for ways of improving the project, approval dependent on the observance of conditions that, in its opinion, would be implemented if the public interest was to be served, no approval, and approval of only part of the proposal. In certain cases the board deferred its recommendation until further information was made available to it.

The Environmental Appeal Board

Formerly known as the Pollution Control Board, the Environmental Appeal Board was established under an amendment to The Environmental Protection Act, 1971.

In accordance with The Environmental Protection Act and The Ontario Water Resources Act, the Environmental Appeal Board provides a mechanism of appeal to persons affected by decisions of officials of the Ministry of the Environment and local health units.

The board, under the chairmanship of I.W. Pasternak, Q.C., is authorized to confirm, alter or revoke Control Orders, Stop Orders, conditions to Certificates of Approval and refusals of Certificates of Approval. During the period from March, 1974 to March, 1975, the Environmental Appeal Board heard 40 appeals, 19 of them dealing with waste disposal sites, ten with air pollution, seven with sewage systems, two with permits to take water, one with well-drilling and one with a landfill operation.

The Farm Pollution Advisory Committee

The Farm Pollution Advisory Committee is comprised of four Ontario farmers, Otto Crone and Harold Eubank of Hagersville, Donald Switzer of Smithville and John Peart of Caledonia. Its primary concern is to provide objective assessments of farm environmental situations. When requested by Ministry officials, the committee visits farms to make recommendations to the farmers about normal farm procedures, for example, manure spreading and cultivation.

As residential growth encroaches upon existing farms, complaints by area residents about farm odour increase: those not settled by Ministry officials are referred to the committee, which in nearly all cases has found a solution acceptable to both parties.

Recommendations by the committee include installation of manure holding tanks, plastic sheet covers for waste

lagoons, improved maintenance of septic tank systems and manure storage systems, and the addition of barn cleaning equipment. Control Orders are issued when recommendations are not implemented within a reasonable time period.

In 1974-75, four complaints were referred to the committee, two in the southeastern region, and one each in the southwestern and west central regions.

The Waste Management Advisory Board

Created by an Order-in-Council in March, 1975, this board, under the chairmanship of Robert H. Woolvett, is an eleven-member citizens' group established to advise the Minister on waste management matters. Its mandate is wide in scope, including the reduction of the quantity of waste products and the development of resource recovery methods.

At its inaugural meeting, the Minister asked the Waste Management Advisory Board to monitor, over a one-year period, the persuasion of soft-drink bottlers and retailers to increase the use of refillable containers for carbonated soft drinks in Ontario. Mr. Newman also requested that the Board assess the results and make whatever recommendations deemed necessary.

The board is also investigating the means of reducing solid wastes generated by liquor and wine bottles.

The Pesticides Advisory Committee

The committee, established in 1970, reviews annually the content and operations of The Pesticides Act, inquires into matters concerning pesticides and pest control, and reviews publications of the Ontario government about pesticides and pest control. Consisting of 13 members drawn from agriculture, industry, universities

and government, the committee held 15 full meetings and numerous sub-committee meetings in 1974-75, under its chairman, Mr. K.G. Laver.

The committee reviewed characteristics of 160 new pesticides, recommending for each the classifications for storage, sale and use. Pesticide containers were examined and recommendations made on modifications for safety, and an investigation of the availability and dependability of personal protective equipment for pesticide users was carried out.

The Committee also reviewed applications from universities for research grants, recommending to the Ministry the funding of 18 projects, totalling \$98,360, for the study of potential environmental hazards, the reduction of pesticide input to the environment and the control of diseases and pests of agricultural crops and on biting fly control.

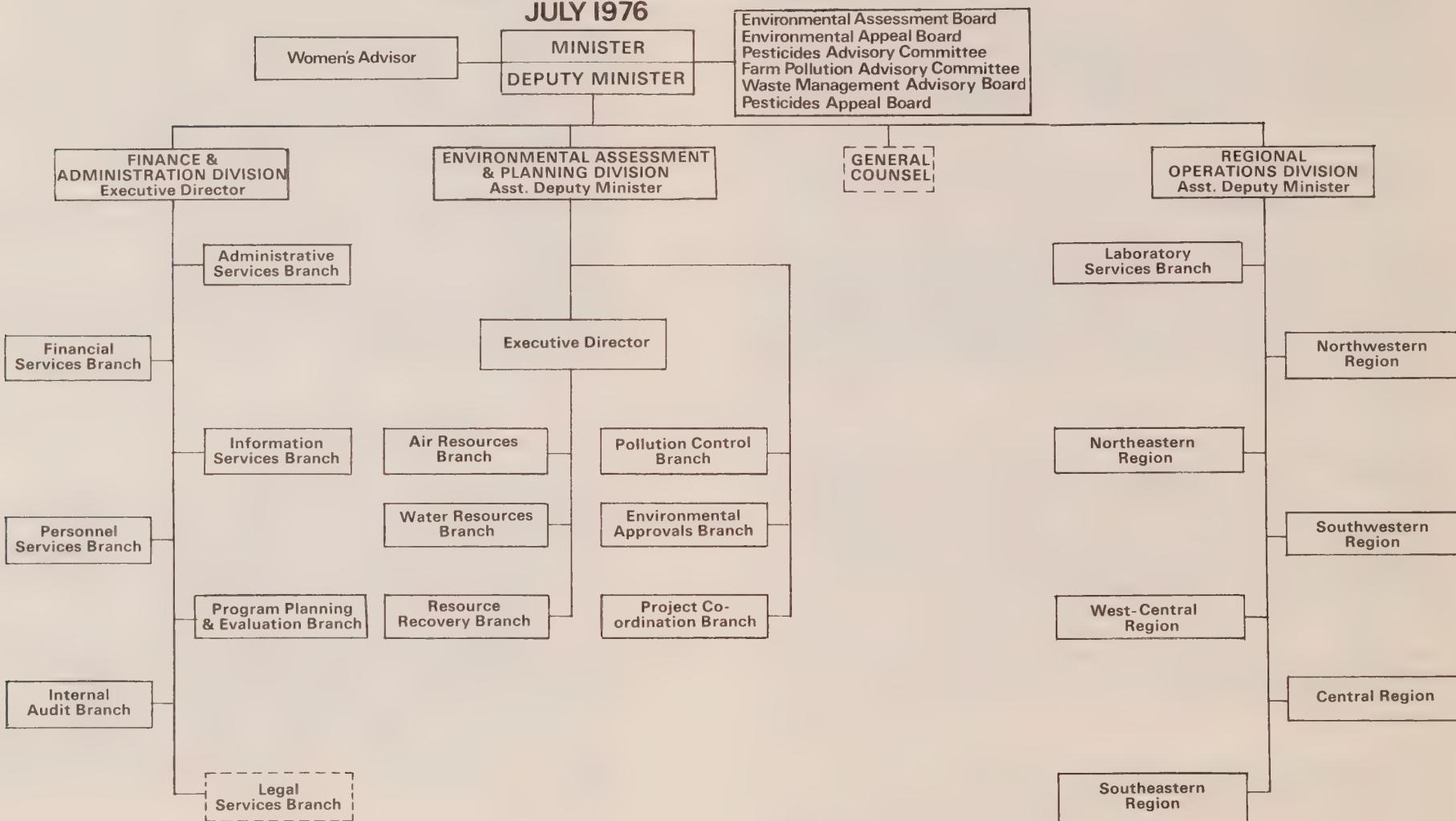
The Pesticides Appeal Board

The Pesticides Appeal Board was established under The Pesticides Act in 1973, and was formerly known as the Pesticides Review Board. In addition to its chairman, I.W. Pasternak, Q.C., it has six members who are drawn from scientific as well as industrial fields.

The Pesticides Appeal Board hears appeals from persons to whom the director has issued Control Orders or Notices of Intent to refuse to issue licenses. It also listens to appeals from persons who have been refused permits to use specific pesticides. The board is authorized to confirm, alter or revoke these Control Orders, licenses and permits where it is considered necessary.

MINISTRY OF THE ENVIRONMENT

JULY 1976





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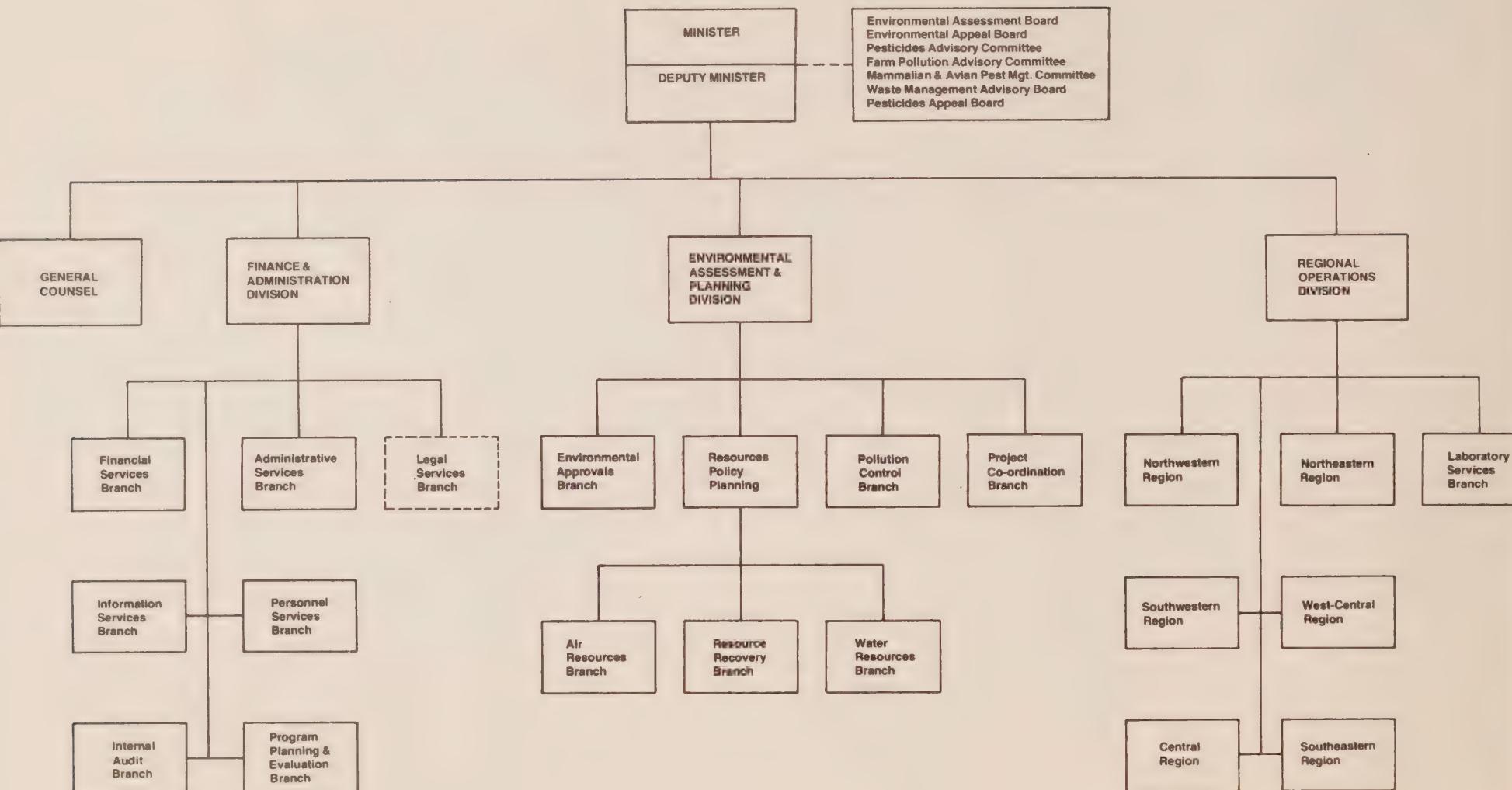
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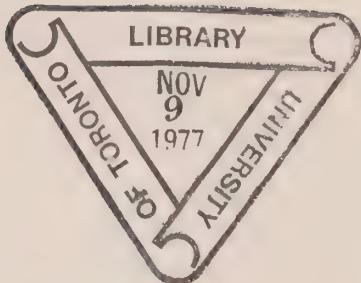
Annual Report 1975-76

MINISTRY OF THE ENVIRONMENT



contents

Organization Chart	Frontispiece	
Letters of Transmittal	2	
Goals, Objectives and Achievements, 1975-76	3	
<u>Environmental Assessment and Planning Division</u>	7	
Air Resources Branch	8	
Water Resources Branch	9	
Pollution Control Branch	12	
Environmental Approvals Branch	15	
Project Co-ordination Branch	16	
Resource Recovery Branch	17	
<u>Regional Operations and Laboratories Division</u>	18	
Regional Map	19	
Laboratory Services Branch	22	
Northwestern Region	23	
Northeastern Region	24	
Southwestern Region	25	
West-Central Region	26	
Central Region	27	
Southeastern Region	28	
<u>Finance and Administration Division</u>	29	
Administrative Services Branch	29	
Financial Services Branch	30	
Information Services Branch	30	
Legal Services Branch	31	
Personnel Services Branch	32	
Program Planning and Evaluation Branch	32	
Internal Audit Branch	32	
<u>Boards and Commissions</u>	33	
The Environmental Hearing Board	33	
The Environmental Appeal Board	33	
The Waste Management Advisory Board	33	
The Pesticides Advisory Committee	34	
The Pesticides Appeal Board		35
The Farm Pollution Advisory Committee		35
<u>Appendices -- Graphs and Tables</u>		37
Graph I - Number and Value of Contracts Tendered Annually 1971/72-1976/77		37
Graph II - Annual Volume of Activity 1971/72-1976/77		37
Graph III - Annual Total Expenditure by Project Type 1971/72-1976/77		38
Graph IV - Annual Total Expenditure by Class Capital Construction Program 1971/72-76/77		38
Graph V - Distribution of Operating Costs Fiscal Year 1975-76		39
Graph VI - Projects in Operation		39
Graph VII - Test Distribution By Programs		40
Graph VIII - Sulphur Dioxide in Downtown Toronto		40
Graph IX - Suspended Particulate in Downtown Toronto		41
<u>Tables</u>		
Table I - Industrial Approvals Section -- Applications for Approval Processed 1975-76		41
Table II - Project Co-ordination Branch -- Capital Construction Program 1975-76		41
Table III - Summary of Industrial Abatement Activities 1975-76		42
Table IV - Laboratory Services Branch -- Number of Tests Performed		43
Table V - Laboratory Services Branch -- Workload by Programs		43
Air Resources Branch -- Toronto Air Pollution Index Levels		44
Table VI - Financial Services Branch -- Table of Grants Under the Abatement Incentive Act		44



To:

The Honourable
George A. Kerr, Q.C., Minister.

Sir,

I have the honour to submit
for your approval the 1975-76
annual report of the
Ministry of the Environment.

Respectfully submitted,

Everett Biggs
Deputy Minister

To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1975, and ending
March 31, 1976.

Respectfully submitted,

George A. Kerr, Q.C.
Minister

goals, objectives and achievements 1975-76

To provide the people of Ontario with the highest level of environmental protection and management, the Ontario Ministry of the Environment has set four major, long-term objectives:

- To control contaminant emission.
- To establish environmental safeguards.
- To manage Ontario's water resources and to manage waste.
- To develop and maintain measures to restore and enhance the natural environment.

The Ministry is committed to providing efficient, economical services through a regional structure, established in 1974. This provides effective and direct service from six major bases and 23 district offices which serve as key delivery points for inspection and pollution abatement activities, local approvals and services and quick, effective action on pollution problems.

The Ministry enjoys a close working relationship with municipalities, and provides consultation and development services with regard to water management and pollution control. As part of this tradition of service, the Ministry operates more than 175 sewage treatment plants and 100 water treatment plants, a provincial initiative which has had a significant effect on environmental quality and on community development across Ontario.

1975-76 achievements

During 1975-76 the Ministry advanced toward its goals and objectives on many fronts. Major activities and achievements are outlined throughout this annual report by Divisions and Operating Branches, and include:

- Progress in research, surveillance and monitoring to clean up pollution of the Great Lakes under the Canada-Ontario and the Canada-United States Great Lakes Water Quality Agreements;
- Progress in air monitoring techniques and substantial air quality improvement;

- Construction of water and sewage facilities, including completion of 14 municipal water works and 34 municipal sewage works and extensive planning for future facilities;
- Expansion of the Ministry's laboratories and services, including the addition of new scientific equipment and research facilities to improve capabilities in the detection, analysis and control of environmental contamination;
- Extensive surveys and monitoring of water quality in Ontario's inland recreational lakes and watersheds;
- Construction of a unique Experimental Resource Recovery Plant for treatment of solid wastes;
- Advances in systems development for improved management and planning of capital and operating programs;
- Preparation of a Model Municipal Noise Control Bylaw for the use of municipalities;
- Enactment of The Environmental Assessment Act, designed to prevent pollution at the conceptual stage of major projects;
- Consolidation of regional and district offices and staff in the Ministry's program of decentralized services.

great lakes clean-up

Ontario has played a lead role in cleaning up the Great Lakes. Phosphorus control, developed extensively in Ontario, is in effect on every sewage treatment plant in Southern Ontario which discharges more than a million gallons a day into the Great Lakes. The long-term effects of Ontario's program and revitalized action in the U.S., offer great promise for a healthier Great Lakes system.

The original five-year Canada-Ontario Agreement on Great Lakes Water Quality which expired December 31, 1975, was renewed in March 1976 to extend to 1980, with extensive studies being undertaken on the effects of waste discharges and land use activities on water quality in the Great Lakes. The original Canada-United States Agreement of 1972 is scheduled to be renewed in 1977.

industrial wastes

Ontario has achieved minimum national levels of control over industrial wastes and is now working to improve waste treatment to meet local water quality needs.

The International Joint Commission identified 28 major industrial polluters in Ontario including several corporate members of the pulp and paper industry. A series of control programs are being developed with this industry and a more aggressive approach is being taken in the prosecution of violators.

In addition to controlling direct discharges from industry, Ontario is working with municipalities to improve the hidden pollution which comes through industrial discharge into municipal sewage collection and treatment facilities. Some new approaches are also being developed to provide safer transportation and ultimate disposal of hazardous liquid industrial wastes.

industrial air pollution

An established and comprehensive system of air pollution monitoring and abatement has resulted in Ontario industry spending or committing over \$1 billion for air pollution control with consequent substantial air quality improvements in Hamilton, Toronto, Sarnia, Sudbury and many other communities across Ontario. The air pollution index, which provides an effective alarm and action program to meet temporary concentrations of air pollution, is now in operation in Toronto, Hamilton, Sudbury, Windsor, Welland, Niagara Falls and Coniston.

exotic contaminants

The increasing sophistication in detecting and monitoring trace contaminants and the advance of medical knowledge are opening new areas of environmental concern.

Here, and around the world, exotic contaminants such as mercury, lead, asbestos, polychlorinated biphenyls (PCBs), Mirex and other chemical compounds are surfacing as potential hazards to human health. This has led to closer ties between environmental and health considerations and new thrusts in pollution study and control.

Substantial gains have been made in controlling mercury and lead discharges. More pervasive contaminants, such as PCBs, are being addressed on a number of fronts with monitoring programs, source identification, and new policies. A hazardous contaminants program has been developed to concentrate our resources on monitoring and abating the most significant hazards among these exotic contaminants.

waste management

The new thrust in waste management is the reduction of waste through policies which discourage the proliferation of waste products and through imaginative and comprehensive work on reclaiming material and energy resources from waste.

A board of citizens, the Waste Management Advisory Board, has been established to assist in the development of these policies and programs.

A new soft drink container regulation will guarantee the availability and encourage the use of refillables, without causing economic shock to the industry or confusion to the consumer.

The Ministry's resource recovery program, to develop facilities to reclaim material and energy resources, is under way, with the new Experimental Plant for Resource Recovery opening in 1977 as the world's first fully instrumented and comprehensive research facility to process waste and produce hard data on which we can develop large-scale waste reclamation and marketing.

Refuse-derived fuel will be used in a cement kiln study and through our "Watts from Waste" plant in Lakeview Generating Station, Etobicoke.

We are involved in a study in Windsor assessing a new type of container and collection system which has great potential for reducing garbage collection costs.

We are also financing a number of area waste management studies to improve waste management systems and determine the suitability of resource recovery plants in communities like Sudbury, Halton, Windsor, London and Hamilton, among others, and the proper timing for any development of the facilities.

environmental assessment

The Environmental Assessment Act, enacted in July 1975, will ensure that public and eventually private projects are kept in tune with environmental planning policy. The Environmental Assessment Board has been established (April 20, 1976) to maintain the environmental hearing functions required by the Ministry and to deal, under the new Act, with any environmental assessments referred to it by the Minister.

The first regulations to implement this new legislation are now in force with regard to Ontario Government projects. The Act will not extend to municipal or industrial projects, except on a voluntary or designated basis, until we have acquired some experience with this new approach to planning.

servicing development

The Ministry of the Environment has a traditional role in development in Ontario inherited with the responsibilities it assumed from the former Ontario Water Resources Commission. Consistent with this tradition, nearly seven million people in Ontario are now served through 457 waterworks in the Province, operated either by municipalities or the Ministry.

In addition, communal sewage facilities have been extended to 5.4 million people.

capital construction

A capital budget allocation of \$155.2 million in 1975-76 provided for expenditures on engineering, construction and property acquisition associated with water and sewage projects across the Province. As at April 1, 1976, 436 projects were under active development, including 359 provincial projects and 77 municipal. In the latter, the Ministry provides financing for a maximum term of 30 years with ownership reverting to the municipality upon repayment. Under the provincial type program, the Province retains ownership of the works as provincial assets and costs are recovered on the basis of water or sewage service rates.

In recent years the Ministry's construction program has grown to the point where approximately 30 per cent of the total annual expenditure for water and sewage facilities in the Province is for Ministry-financed works. In Ontario there are 435 municipalities which are being serviced by communal water and/or sewage works. The Ministry has been, or currently is, involved in 368 projects, entailing 85 per cent of these municipalities.

Despite these achievements, however, there is still a substantial demand for new capital commitments from the Ministry. Outstanding requests for services have now reached the billion dollar mark and there is no immediate or easy solution in view. The pace of development and growth in Ontario is a dominating influence in this demand.

In a period of fiscal constraints, when the Ministry is unable to proceed with every request for funding, the Ministry has formulated a "Management By Results" (MBR) system to establish priority of projects.

An MBR assessment system is utilized to evaluate proposed projects in terms of their contribution to achieve, in the following order of importance: the removal of health hazards, environmental protection, accommodation of growth, and community enhancement. Briefly, projects are reviewed on the basis of these objectives and are graded 1 through 5, with a minimum score being required before a project is accepted. However, a special project class can supplement an MBR ranking to allow for continuity of projects and recognition of government objectives.

looking forward

- . The Ministry has developed and implemented a more direct and efficient structure to provide service on a local basis. We intend to continue improving the level of service provided as we gain experience in this structure.
- . We intend to continue expanding our knowledge and understanding of environmental contamination, our measurement and assessment methods, and our environmental protection and restoration systems.
- . We now have the instrument, in the form of The Environmental Assessment Act, to do a better job of forestalling undesirable environmental effects.
- . We are on the threshold of a new and exciting approach to waste management, which combines the reduction of waste, through measures such as the soft drink container regulations, with a program to develop the technology, facilities and markets for large-scale reclamation of material and energy resources from garbage.
- . And finally, we have a traditional role in providing essential water and sewage services, both for environmental protection and for development. Rising capital construction costs, increasing pressures from growth and development and public demand for a high level of environmental service make it increasingly expensive to maintain this traditional role. The challenge here is to work out an approach to servicing which will meet both environmental and growth needs at a cost the Province of Ontario can afford.

environmental assessment and planning division

Assistant Deputy Minister: Kenneth H. Sharpe
Executive Director: W.B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

- To serve as a central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation;
- To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants;
- And to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

air resources branch

The main thrust of the Air Resources Branch program is to keep the Ministry in the forefront of the ever-advancing technology of air pollution and its control, and to recommend the reflection of this knowledge in new air management policy and legislation. At the same time the wide scope of routine monitoring and surveillance of air quality, vegetation damage, automobile and stack emissions must be maintained and improved where technology and resources permit. 1975-76 saw considerable expansion in both these major areas of the Branch's endeavor. All sections of the Branch participate in the development of criteria for use in regulations.

Technology Development & Appraisal Section

In 1975, a Hazardous Contaminants Group was set up in this Section to anticipate as well as to react to new knowledge of the environmental effects of an array of chemicals. This Group, working with our field crews on the special monitoring vans, develops methods of detecting these pollutants from which commercial equipment is usually not readily available.

The Technology Group keep the Branch abreast of the process of our complex industrial plants to assess emissions of air pollutants from these sources and to maintain current knowledge on control methods available to industry. Energy related industry, PCB's application processes, vinyl chloride and poly-vinyl chloride technology, asbestos using industry, and industries such as abrasive, steel, non-ferrous metals, pulp and paper have been investigated.

Some 35 compliance tests have been performed in Ontario and witnessed by the Source Testing Unit. New sampling methods have been developed for many of them: sulphuric acid, PCB's, arsenic, asbestos, total hydrocarbons. A comprehensive emission inventory of lead was conducted and results published during the year.

The Monitoring and Instrumentation Development Unit completed a comprehensive survey in the Northeastern Region, where most of the major sources were under surveillance for several weeks. Other surveys performed included VCM in Welland; asbestos Province-wide; PAH in Sault Ste. Marie, and mercury in Cornwall.

Four seminars related to the Research Grants Program were held in February 1975, one in Sudbury, the remainder in Toronto. A large number of proposals for grants were evaluated with 22 being subsequently funded. The progress of investigators was monitored by the Unit staff. A booklet describing the Research Grants Program was prepared and distributed to universities throughout the Province.

Phytotoxicology Section

While carrying on an extensive and growing assessment of air pollution effects on soil and vegetation, the members of the Phytotoxicology Section attended 18 workshops and seminars to maintain this Ministry in the forefront of phytotoxicology technology. Sixteen papers on studies and effects were presented by the Section in the U.S. and Canada, and four were published in technical journals.

Two hundred and forty-nine complaints concerning vegetation and soil pollution were received from the public. Seventy per cent of these complaints were confirmed and reflected the widespread use of chemicals in our society -- such as lead, boron, sodium chloride, sodium hydroxide, etc., and side effects such as salt spray and ozone. Reports confirming contaminant diagnosis were forwarded to the Board of Negotiation for settlements of damage claims.

Agricultural surveys indicated varying degrees of ozone damage on approximately one million acres of white beans. Damage was improved over 1973 but worse than 1974. Damage to tomato crops from peroxyacetyl nitrate (PAN) was less severe in 1975 than in the previous three years.

Pre-operational vegetation base line studies in the Nanticoke area indicated no adverse effects from the coal-burning operations of Ontario Hydro. Indicator plots of vegetation sensitive to ethylene and oxidants were established in the vicinity of Sarnia to anticipate start-up of low density polyethylene plants in that area.

Automotive Section

This Section maintained its routine spotchecks of the emissions of some 10,600 cars in order to maintain a running evaluation of the automobile's contribution to air pollution and to enforce the requirement that control devices are not tampered

with. This included spotchecks at 11 municipalities during the summer months. Inspection of vehicles on used-car lots is used to enforce the replacement of pollution control devices on vehicles being offered for sale. In this program, 1,210 cars were checked at 138 dealerships.

Investigations were undertaken to provide background data on several topics. These were:

- (1) Effect of air filter on vehicle tailpipe emissions
- (2) Vehicle fuel consumption during idling
- (3) Evaluation of multiple spark discharge unit

Automotive inspectors make regular Highway patrols with the O.P.P. to enforce the visual emissions aspect of exhaust from trucks. This has resulted in 374 charges and 316 convictions under The Highway Traffic Act.

Air Quality & Meteorology Section

At present Ontario's air quality monitoring network consists of over 1100 instruments. This network produces over 2½ million data points to be validated, correlated and interpreted by the professional and technical staff of this Section. In addition, many of these instruments are connected into the Toronto computer which produces the Air Pollution Index readings for eight industrial centres in Ontario. In 1975, New Sudbury and Coniston were added to the Index network which is used to alert Ministry control officials, the public and industry when adverse weather conditions may make it necessary to cut back the emissions of air pollutants.

The Air Quality & Meteorology Section produced air quality simulations to test the abatement strategies on community planning studies for several urban areas including Toronto, Sarnia and Etobicoke. A computer simulation model to predict the scavenging of air pollutants from the atmosphere has been developed.

Criteria Development & Program Planning Section

This Section co-ordinates the input of all of the other sections into the production of regulations or other legislation. In the past year, 17 new standards for air contaminants were added to the growing list of chemicals in Ontario's regulations.

Working closely with the Ministry of Health, a new procedure was developed for the production of air quality standards which ensures a more comprehensive study and evaluation of all pertinent factors. The procedure was expanded to include a review of proposed standards by the Occupational and Environmental Health Advisory Council.

water resources branch

The Water Resources Branch continued to provide water management services, studies and criteria on behalf of the Ministry, its regional offices, other ministries and municipalities in order to protect and preserve water resources throughout the Province.

Great Lakes

The importance of a strong surveillance program in the campaign to clean up the Great Lakes was recognized in a new five-year agreement between Canada and Ontario, signed in March 1976. In the first year of the Agreement, Canada has agreed to pay a maximum of \$762,500 in matching funds to the Province for its surveillance program during 1976-77.

Investigations carried out during the year included assessments of the impact of the Grand River on Lake Erie and the Thames River on Lake St. Clair, identification of the extent and sources of bacterial degradation in the Detroit River, and assessment of the impact of industrial discharges at Brockville and Maitland on water quality and biota of the St. Lawrence River. Continued monitoring of mercury concentrations in sediments of the St. Clair River and Lake St. Clair confirmed the trend to decreasing levels.

Results of a nine-year study of data from intakes withdrawing water from Lake Erie's western basin indicate that algal levels have decreased markedly every year since 1971. The decrease coincides with joint Canadian and U.S. efforts to reduce phosphorus input to Lake Erie and Lake Ontario. Similar long-term studies of algae are under way at other selected locations on the Great Lakes. The Lake Erie findings represent the first documentation of "recovery" in Lake Erie, and provide valuable evidence for the effectiveness of legislation limiting phosphate levels in laundry detergents and of phosphorus removal at sewage treatment plants within the Great Lakes basin.

A water quality survey covering the effects of artificial mixing by aeration was performed in Hamilton Harbour during 1975. Dissolved oxygen increased in the deeper harbour waters and remained normal in the surface waters. There was a decline in ammonia levels resulting in an expansion of the vertical habitat for biota. Sources and sinks of oxygen were studied, with emphasis on sediment uptake which was determined to be important in oxygen losses from the harbour. Surveys were initiated to determine what effects zinc has on the harbour environment. It was apparent that artificial mixing increased the rates at which wastes became stabilized.

A review of all available information on water quality, water movement, sediment quality, sediment transport, aquatic biology, and waste inputs in the Central Toronto Waterfront area was undertaken on behalf of the Central Waterfront Planning Committee. A comprehensive report outlining the major issues surrounding water quality and water use in the area, recommending measures for enhancing quality, and pointing out further information needs, was published by the Planning Committee in January 1976.

Field programs for the collection of data on existing water quality and the identification of impairment in Lakes Huron and Superior and in the St. Mary's River were completed. Staff continued in the major task of synthesizing this information with data collected since 1973, and completed contributions to data on the near-shore water quality, exchange processes, and land drainage and tributary loadings for inclusion in the report of the Upper Lakes Reference Group to the International Joint Commission. This study confirmed that the main bodies of both lakes and much of the near-shore zone are of high quality. It identified several locations close to developed areas where water quality is degraded or where potential problems exist, and resulted in recommendations to overcome the problems and preserve high quality in the lakes.

Policy guidelines were developed to control heated effluent discharges to the Great Lakes. The guidelines relate to allowable discharge temperatures, temperature differences, methods of withdrawal and disposal, contaminants in discharge waters, alternative cooling facilities and circulation patterns.

Kawartha Lakes

In the Kawartha Lakes system, mechanical harvesting of aquatic plants and the assessment of the environmental effects

of large-scale vegetation removal were continued in southern Chemung Lake in 1975. A total of 734 acres was harvested, resulting in the removal of 3,325 tons of vegetation. The plants contained 13,200 lbs. of nitrogen and 1,245 lbs. of phosphorus. The latter value was equivalent to about half of the annual phosphorus loading to the southern part of the lake. No detrimental environmental effects on algae populations, plant communities, or the fisheries were observed from the harvesting operation.

Lake Simcoe

A five-year study of the water resources of the Lake Simcoe basin was completed and a report entitled "Lake Simcoe Basin - A Water Quality and Use Study" published. The results of the 1971-75 investigations show that water quality conditions in the lake are generally satisfactory and quite suitable for recreational activities, water supply and other common uses. There are, however, indications such as algal scums, increasing attached algal growth and an apparent stress on the cold water fishery which suggest that natural causes and man's increasing activity in the basin are resulting in long-term water quality changes.

Artificial Mixing in Small Lakes

Artificially-induced destratification was carried out in two highly eutrophic southern Ontario Kettle Lakes for the purpose of increasing oxygen levels in bottom waters, improving water quality, altering the species composition and numbers of algae, and restoring the fisheries and recreational amenities of the lakes. Shore-based compressors were used to pump air through a diffuser line into the deepest portions of the lakes. The aeration of Thompson Lake was initiated in late 1971. To date, changes in water quality and phytoplankton populations have been extremely variable. However, since 1973 rainbow trout have been stocked annually and appear to be thriving. Aeration in Heart Lake, a heavily used recreational lake, was commenced in July 1975. Although some early improvements in water quality were apparent, the lake had a rapid succession of blue-green algal blooms throughout the summer. Considerable effort is still required to fully understand the changes which can occur in nutrient-rich lakes as a result of artificial mixing.

Sudbury Area Lakes

Experiments on both large and small lakes in the Sudbury area demonstrated the effectiveness of adding lime as a tool to establish and maintain near neutral water conditions in lakes subjected to acid input. Liming has changed lake plant communities beneficially to those more typical of unstressed lakes. Experimental additions of phosphorus to treated lakes resulted in an increased rate of biological recovery and a potentially increased food supply for fish.

Grand River Basin Water Management Study

A broad range of water resource investigations were carried out in the Grand River basin, in co-operation with the Ministry of Natural Resources and the Grand River Conservation Authority. Analyses of the waste assimilation capacities of the Speed River downstream from Guelph and the central Grand River from Waterloo through Cambridge were undertaken to provide updated waste loading guidelines for sewage treatment plants serving Guelph, Waterloo, Kitchener, and Cambridge. Effluent dispersion studies carried out below major sewage treatment plant outfalls showed that complete mixing of effluent and river water occurred within three to five miles of the outfall. Streamflow analyses were conducted to evaluate low flow augmentation under various operating plans for the Belwood, Conestogo and Guelph reservoirs and to predict the impact on streamflow and water quality of constructing municipal wells next to the Grand River. This latter study was carried out in conjunction with extensive ground water supply investigations undertaken by the Regional Municipality of Waterloo.

Thames River Basin Water Management Study

The Thames River Basin Water Management Study, undertaken jointly with the Ministry of Natural Resources, was completed with the publication of the main report, a summary report and the first two in a series of technical reports. The conclusions and 29 recommendations of the main report are addressed primarily to proposed solutions to water quality impairment and flooding, the primary water management problems in the basin. The study established the capacities of water resources to support various uses and defined a series of options for planning and management decisions.

Water Resources Inventories

A report on the water resources in the Moira River basin was published. Results of the study indicated an uneven distribution of water resources in the basin, necessitating careful management in order to overcome problems of flooding during the spring and inadequate supplies in the summer. A similar water resources inventory study was on-going during the year in the Duffins Creek and Rouge River basins and another study was commenced in the South Nation River basin.

The publication "Water Well Records for Ontario", Bulletin 2-12, was released, showing ground water and geologic data for Northumberland, Durham and Victoria Counties. Three publications providing valuable surface water information were also released: "Selected Streamflow Data for Southern Ontario, 1974", "Map 3005-2, Low Flow Characteristics of Streams in Southwestern Ontario" and "Data for Northern Ontario Water Resources Studies, 1972-73".

Engineering and Scientific Services

Work continued to identify acceptable controls for activities that can cause ground water contamination.

Geophysical surveys using seismic and electrical resistivity methods were carried out in several areas in support of Ministry ground water development projects. Ground water contamination also was investigated using electrical resistivity techniques.

The soils laboratory continued to conduct a variety of analyses on soil samples from various sources within the Ministry, the majority being analyses of the physical properties of sediments submitted by the PLUARG program.

River quality models were operated in support of Regional programs to set effluent waste-loading guidelines for Upper Junction Creek in the Regional Municipality of Sudbury and for the Saugeen River, downstream of the Town of Hanover. A workshop was held for Ministry staff to provide familiarization and training in the use of computer models in waste assimilation analysis.

The capacity for bioassays was increased for the Ministry's industrial wastes monitoring program, and field stations were

operated at Red Rock on Lake Superior and at Sudbury. The Red Rock program established the relationship between the acute toxicity of a pulp mill effluent to fish and the sublethal concentration which reduced growth or tainted flesh of fish. The Sudbury operation determined the contribution of low pH to copper toxicity in fish reproduction. Spottail shiners from eleven near-shore collection sites on Lakes Ontario, Erie and St. Clair were analysed for organochlorine residues. Higher PCB residue levels in flesh were found in areas of high industrial activity.

pollution control branch

POLICY AND PROGRAM DEVELOPMENT GROUP

Municipal and Private Section

A broad range of activities continued on the Great Lakes "clean-up" under the International Joint Commission (IJC) on Great Lakes Water Quality.

The Ontario and federal government partnership under the Canada-Ontario Agreement on Great Lakes Water Quality has grown and considerably enlarged its joint commitments as both governments have worked together in responding to the IJC recommendations. The research and information interchange, planning strategy and co-operative commitments between Ontario and the eight American states that border on the Great Lakes have been vitally rewarding to all jurisdictions concerned. This interchange with our neighbors has cemented a close and invaluable partnership among the 12 federal, state and provincial governments since the Canada-U.S. Agreement on Great Lakes Water Quality was signed in 1972. It has meant an interchange of all manner of scientific research and technological knowledge on all aspects of environmental care and protection that goes far beyond immediate matters pertaining to the Great Lakes.

All units of the Municipal and Private Section continued to participate in the activities of the IJC Pollution from Land Use Activities Reference Group (PLUARG) by providing services on task forces.

The Solid Waste Unit is co-ordinating PLUARG studies to determine the effects of processed organic waste disposal and

sanitary landfill sites on Great Lakes Water Quality. Both studies involve the collection of field data, determination of contaminant migration, and their application to the Great Lakes Drainage Basin.

The Private Sewage Unit, through representation on the U.S. Committee for on-site sewage disposal set up by the Board of States Sanitary Engineers for the States bordering on the Great Lakes and Upper Mississippi, participated in developing disposal standards in these ten American states.

The Municipal Sewage Unit is responsible under the Canada-Ontario Agreement for identifying and quantifying waste from Ontario municipalities discharging into the Great Lakes. All the waste loadings, together with the planned remedial programs and abatement status of Ontario municipalities discharging into the Lakes are reported yearly through the Water Quality Board Annual Report. In addition, this Unit participates in the special IJC Upper Lakes Reference Group study to assess the pollution problems in Lake Huron and Superior. Volume I (Summary and Recommendations) of the study has been published.

The first five-year term of the Canada-Ontario Agreement ended in December 1975. Under this Agreement, \$6 million was spent in research and development of efficient and economical waste treatment processes, including the treatability studies of phosphorus removal at all significant municipal sources in Ontario. By the end of the fiscal year, 168 sewage treatment plants were undertaking phosphorus removal on schedule, with a total of 183 plants expected to be in operation by the end of 1976.

Under the newly negotiated four-year term of the Canada-Ontario Agreement, signed in March 1976, approximately \$4 million will be provided over the next two fiscal years for continued research and development of waste treatment processes, and for surveillance of water quality near the Canadian shoreline of the Great Lakes.

The Infrastructure Agreement between Central Mortgage and Housing Corporation and the Ministry was signed in September 1975, scheduled to run through to December 1977. Over this three-year period an estimated \$550 million will be provided in loans and grants for the construction of sewage and water works facilities, storm sewer systems as well as for the planning of these facilities on a regional basis.

During the fiscal year, an additional 15 municipal water works and 27 municipal sewage works began operations.

On March 31, 1976, the total number of municipal water works in the Province stood at 457 with a total capacity of approximately 1.8 billion Imperial gallons per day. The number of municipal sewage works totaled 337 with a total capacity of approximately 1 billion Imperial gallons per day.

A revision of the regulations for septic and holding tanks was initiated during the year, subsequent to the publication of a Canadian Standards Association report.

"Project Remove", the derelict motor vehicle hulk clean-up program, was carried out in 18 municipalities, most located in northern Ontario. Contracts were established between the Ministry and municipalities whereby the Ministry initially pays for establishing the local program of locating, collecting and delivering derelict vehicles to certified salvage sites. Revenue from the sale of hulls remains with the municipality for further clean-up efforts. By March 31, 1976, some 11,657 hulls were located, 8,886 were released by owners and 5,875 were delivered to certified sites.

Industrial Section

This Section continued to develop effective industrial pollution control programs and criteria, and to provide technical support to the Ministry's Regional Operations.

The problem of liquid industrial waste disposal remained a high priority with the Industrial Section. With the co-operation of the liquid waste haulers, a voluntary way-bill system for the control of liquid industrial waste haulage and disposal was put into effect in January 1976. Preliminary statistics obtained from the system's first three months of operation confirmed an estimated 40 million gallons per year of liquid industrial wastes required disposal.

The following industrial guidelines were issued during the year:

- Environmental Design Considerations for Ontario Mining Operations;
- Tailings Disposal, Recommendations for Site Selection;
- Country Feed and Grain Elevators.

The following guidelines are under preparation or revision:

- Effluent Guidelines and Receiving Water Quality Objectives for the Mining Industry;
- Terminal Grain Elevators;
- Small Abattoirs;
- Wood Waste Disposal;
- Saw Mills and Board Mills;
- Industrial Discharges of Phosphorus;
- Petroleum Refining;
- Petroleum Bulk Terminals;
- Agricultural Code of Practice.

Staff participated in a number of federal task forces, both air and water, associated with the federal program for the development of regulations or guidelines for industrial air emissions or effluent discharges. The Section's three units -- Mining and Metallurgy, Chemical and Petroleum, and Food and Forest -- continued to maintain close contacts with trade associations in order to ensure that Ministry policies and programs are made available to individual association member industries.

Pesticides Control Section

The Pesticides Control Section continued to license exterminators and vendors, to issue new technical guidelines, and provide training courses for exterminators.

During 1975-76, termite and mosquito control programs were stepped up throughout the Province.

Termites have been found in at least 15 urban municipalities in Ontario, including all six municipalities in Metropolitan Toronto. During the summer of 1975, the Section initiated a detailed survey of possible termite areas, with the intention of eventually mapping all termite-infested areas in the Province.

During the year, surveillance of mosquito breeding sites was undertaken, and a report compiled indicating types and timing of insecticide applications, results, and monitoring of residues. When an epidemic of St. Louis encephalitis developed in Windsor during September 1975, the Ministry was called on and assisted in evaluation of what emergency operations should be undertaken and provided technical information to the city's

Medical Officer of Health. Guidelines for municipal abatement programs and technical information on pest species, registered insecticides and evaluation procedures were prepared and circulated to areas concerned.

Noise Pollution Control Section

The Environmental Protection Amendment Act, 1974 (No. 2) was proclaimed on October 8, 1975, thereby amending The Environmental Protection Act, 1971 to permit municipalities to adopt a noise bylaw under the provisions of the Act.

A Model Municipal Noise Control Bylaw was prepared for the use of municipalities. This bylaw can be adopted in whole, or in part, as required. This model bylaw was revised early in 1976, and includes a number of technical publications which effectively become guidelines for sound and vibration control under the provincial legislation.

As a result of rapid advances in solid state electronic technology, sound measuring monitors recently acquired by the Ministry and deployed in the field for noise investigations have resulted in significant improvements in the assessing of noise impacts on new subdivisions and residential areas. In all, 150 subdivisions seriously affected by noise were assessed on behalf of the Ministry of Housing. On the recommendation of this Ministry, appropriate noise control measures are now being required of developers of all new housing.

Contingency Planning Section

This Section published "The Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials" and two publications supplemented this manual. The contingency plan is intended to organize the activities of the various government agencies which may be involved in a spill incident of major proportions, and provides a command structure as well as establishing a method of operation for the forces engaged in dealing with a major pollution incident. The Ontario spill contingency plan also fulfills the requirement which under Order-in-Council 1487/75 approved May 28, 1975, assigns this Ministry the task to co-ordinate the response of the Government of Ontario to emergency situations which may arise from spills of chemicals, oil, or other contaminants.

The Section encouraged and assisted several larger municipi-

palities in their efforts to prepare municipal spill contingency plans. Such plans have contributed significantly to effective early responses in serious spill incidents. It also sponsored, co-sponsored or assisted in the training of staff in the public and private sectors to respond to spill incidents.

During the year the Section received reports on 681 spills. Of these, 493 involved oil. The average oil spill involved 1,200 gallons.

Spill containment, clean-up and restoration is a relatively new program and expert instruction is in short supply. To assist those involved, staff have participated in the production of film and videotape training aids on various appropriate topics. These have helped to improve the state of preparedness to combat spills.

TECHNOLOGY DEVELOPMENT AND RESEARCH GROUP

The Technology Development and Research Group, comprised of three Sections -- Applied Sciences, Water Technology and Wastewater Treatment -- continued to provide innovative engineering design concepts and improved techniques in water and wastewater treatment and monitoring methods as technical backup and support services on behalf of the Ministry's program branches and regional offices, as well as for other ministries, municipalities and industry.

The Wastewater Treatment Section maintains the Ontario Experimental Facility at Brampton, a 5.0 MIGD activated sludge plant for use in developmental research work and operator training, and also operates an analytical laboratory. Eight technical papers were presented during the year on research projects.

Major investigations of the Water Technology Section were concerned with chlorinated organics, asbestos, ozone, water plant waste discharge and biota in water distribution systems. A survey of 105 water treatment plants in the Province was carried out to determine the characteristics of their waste discharges. A cost estimation of the appropriate methods to collect, treat and dispose of the wastes was made, with a report on this work being in the final draft stages at year's end. A survey concerning biota in water distribution systems, their abundance and possible methods of control was initiated. The monitoring program concerning chlorinated organics in drinking

water samples continued. Water samples from 32 municipal water supplies are being collected and analysed on a monthly basis.

The Applied Science Section continued to carry out project research work using the test facility and research laboratories at Resources Road in Rexdale, and at field installations of pilot plants and facilities. Section activities in 1975-76 resulted in the publication of 11 technical reports.

environmental approvals branch

A major highlight of this Branch's operations in 1975 was the approval by the Legislature on July 14 of The Environmental Assessment Act. This legislation was three years in preparation and represents exhaustive consultation with the public. The Act was proclaimed in late 1976.

The Environmental Assessment Act injects new strategy into many Ministry programs by preventing potential environmental damage in the planning or conceptual stage of major projects. The Act requires that the proponents of major undertakings submit to the Minister of the Environment for comment and approval an Environmental Assessment which will forecast the effect the project will have on the environment, both natural and man-made, during construction and operation.

Under the new legislation the environment is defined as more than air, water and land, and man, plant and wildlife. It also encompasses social, economic and cultural factors, including buildings and structures.

Where the impact of projects may affect people, decisions must be made in consultation with the public. The new legislation, therefore, provides for such consultation in an open manner, with public comment invited and welcome. Once a review of the document has been prepared, it will be open for public inspection and comment for a period of at least 30 days. After this, the Minister of the Environment may decide that a Hearing should be held by the Environmental Assessment Board, an impartial decision-making body which will hear the pros and cons of the project and make a decision.

The Environmental Assessment Act will apply at first only to projects proposed by ministries and agencies of the Ontario Government. Ministries which will be particularly affected are

Environment, Natural Resources, Government Services and Transportation and Communications as well as Ontario Hydro. It is expected that the Act will be applied to the municipal and private sectors of Ontario in the near future.

While the Environmental Approvals Branch as a whole reviews many large projects, individual sections are involved in important studies and activities.

- The Industrial Approvals Section staff attend meetings of the Reactor Safety Advisory Board to review applications submitted by Ontario Hydro to the federal Atomic Energy Control Board for the Board's approval to construct nuclear generating stations. Through the Advisory Committee, the Section can issue provincially-oriented approvals for the plant without conflicting with the federal approvals requirements.
- The major function of the Industrial Approvals Section is to review the applications submitted by industry, and if appropriate, to issue Certificates of Approval allowing the industry to proceed with construction in accordance with pertinent provincial requirements. The number of applications received and processed during the 1975-76 fiscal year has been summarized in Table I.
- The Industrial Approvals Section has met during the year in an advisory capacity with representatives of restaurant operations to deal with odour problems. This is a serious local nuisance in some areas and the Ministry is working with equipment suppliers to solve the problem.
- The Municipal and Private Approvals Section jointly with the Water Resources Branch is developing methods of treating storm water runoff. This potentially serious pollutant enters rivers and streams from many sources, such as farming operations, city roads, parking lots and industrial sites. It is expected that the Ministry will issue guidelines on storm water management sometime in 1977.
- The Land Use Co-ordination and Special Studies Section participates, as members, observers or technical advisors, in committees and task forces that deal with overall provincial planning and land use matters. Some

of these committees or task forces deal with specific areas of the Province, such as: counties, regional municipalities, the Parkway Belt and river basins. Others are concerned with such matters as: economic development, agricultural land, research, environmental standards, policy formulation, and use of statistical data.

- One of the major projects the Design and Equipment Section was involved in last year was the quality control review of equipment to be used in the York-Durham water and sewage works which will, when completed, service major communities in the regional municipalities of Durham and York. This project, which was part of the approximately \$200 million worth of proposals reviewed and approved by the Section, involved the laying of many miles of pipe and the construction of a sewage treatment plant on the Lake Ontario shoreline just east of the Pickering nuclear generating station.
- The Environmental Assessment Section is in the process of co-ordinating the preparation of a detailed Ministry submission on environmental concerns to the Royal Commission on Electric Power Planning which is considering the planning of electric power supply in Ontario to the end of the century.
- The Section is also spearheading the Ministry's review of the large Lake St. Joseph iron ore mining development and attendant townsite in Northwestern Ontario. A special government task force is examining possible locations for a new town and a railway as well as potential pollution problems from the proposed mining operations.

project co-ordination branch

The Project Co-ordination Branch, which has prime responsibility to manage, co-ordinate, and review all Ministry capital sewage and water projects from inception to the completion of construction, handled 262 contracts under construction during the fiscal year.

The Branch arranged the execution of final agreements on 24 new provincial projects, and 12 new municipal projects (see Table II). A number of water and sewage works were undertaken for municipalities having no communal facilities and extensions were made to existing facilities in many other municipalities. Major sewage and water projects were undertaken in South Peel Region, Niagara Region and York-Durham area and major extensions made to sewage treatment facilities in Kitchener and Georgetown to permit the development of new housing and correct environmental problems.

The Lambton Water System, serving the western area of the County, was made fully operational in 1975.

In the northern areas of the Province programs were developed to provide communal sewage and water facilities which would allow for growth and expansion of industry and housing.

The "Management by Results" (MBR) system, introduced into the Capital Construction Program during 1974-75, became fully effective this fiscal year. Due to provincial fiscal restraints, new projects were graded on criteria to determine priority of need before approval was granted. The MBR priority rating thus allowed projects to proceed subject to availability of funds and according to need, largely based on health and environmental considerations.

MBR Project Evaluation in 1975-76:

	No.	Value
New Projects Evaluated	29	\$51,310,000
New Projects Accepted	19	33,370,000
New Projects Rejected (or Postponed)	10	17,940,000

The Capital Construction Program has provided services for almost 85 per cent of the municipalities in Ontario over the past several years, involving capital financing by the Ministry and/or utilization of the Branch's engineering expertise and advice.

The Branch continued to administer a new program of grants, introduced in the Budget in 1974, which amount to 15 per cent of the gross capital cost of regional or area sewage and water facilities being provided to regional or specially restructured municipalities.

Graphs I through IV for fiscal years 1971-72 to 1975-76, indicate growth in:

- (1) Number and value of contracts tendered;
- (2) Construction activity by numbers of contracts;
- (3) Annual total expenditures (for sewage projects and for water projects);
- (4) Annual total expenditures (for provincial projects and for municipal projects).

Late in the fiscal year, the Property Section was transferred to the Ministry of Government Services in order to unify the administration necessary for the acquisition of property and easements and related matters.

In anticipation of The Environmental Assessment Act, the Branch developed guidelines and procedures together with environmental controls in its contract specifications to meet the intent of the Act. Some major construction projects (e.g. South Peel and York-Durham schemes) were specific examples where environmental guidelines were incorporated into the construction documents and where public information meetings were held in advance of contract finalization.

resource recovery branch

While waste management has traditionally been a municipal responsibility, and largely remains such, the Resource Recovery Branch was established in 1974-75 to co-ordinate the Province's resource recovery program, necessitated by the growing scarcity of landfill sites to dispose of urban garbage, and the need for conservation of energy and natural resources.

During 1976, the Branch was transferred from the former Utility and Laboratory Services Division to the Environmental Assessment and Planning Division.

Key program elements of the Resource Recovery Branch have focused on construction and technology development of the Experimental Plant for Resource Recovery in North York; development of municipal processing plants; demonstration projects for waste reclamation; and waste management planning.

Resource Recovery

The Ministry commenced design of a full-size Experimental Plant for Resource Recovery in 1973-74, and construction began in the winter of 1975. The Experimental Plant is being built in North York at an estimated cost of \$13.5 million, capable of processing 800 tons of solid waste daily. The plant will become operational in the summer of 1977.

The principal objectives of the plant are:

- to develop and evaluate processes and equipment for resource recovery;
- to develop criteria for estimating capital and operating costs of a range of plant sizes and process combinations;
- and, to provide a regular supply of recovered resources of controlled quality for product utilization and market development.

Municipal Processing Plants

Under the provincial Waste Management Program the Ministry offered to finance and construct waste processing plants in the Regional Municipality of Sudbury, City of London, Regional Municipalities of Halton and Peel, Metropolitan Toronto and Eastern Ontario. Fifty per cent of the capital cost of the plant would be recovered as a user charge over a 40-year period.

Feasibility studies were initiated in each of these municipalities to provide more detailed information on plant costs, waste management system costs and potential markets for recovered materials. This information would then form the basis for an agreement with the municipality and the Province.

Demonstration Projects

The Ministry is further encouraging the development of Resource Recovery by providing partial funding in demonstration projects. One of these with great future potential and promise is the "Watts from Waste Project".

Under an agreement with Metropolitan Toronto, Ontario Hydro and the Ministry, this project will examine the feasibility of using refuse-derived fuel (RDF) as a partial replacement for coal in a boiler at Lakeview Generating Station. The project

will proceed in two phases with Phase 1 expected to commence in 1979. In this phase a processing facility constructed by Metropolitan Toronto would recover 130,000 tons of RDF from 210,000 tons of solid waste. This quantity of RDF would replace approximately 57,000 tons of coal. Preliminary design leading to environmental approval of the plant and site is under way.

Waste Management Planning

Assistance is available to municipalities to carry out waste management system studies leading to resource recovery. Studies during 1975-76 were active in the following municipalities: Regional Municipalities of Peel, York-Durham and Niagara and Counties of Northumberland and Middlesex-Elgin.

regional operations and laboratories division

Assistant Deputy Minister: J.R. Barr

The Ministry's six regional offices (see map) completed their staffing and became fully operational in 1975-76.

The regional offices, supplemented by 23 district offices, provide environmental protection services such as abatement programs and complaint investigation, regional environmental assessment activities and the operation of sewage and water projects throughout the Province. In each of the six regions these programs are carried out by four sections: Industrial Abatement, Municipal and Private Abatement, Technical Support (environmental monitoring and planning) and Utilities Operation.

In February 1976, the Laboratories Services Branch was transferred to the Regional Operations Division. The Branch is responsible for the main laboratory located on Resources Road in Rexdale and the co-ordination of regional laboratories in Kingston, London and Thunder Bay.

Municipal and Private Abatement Section

The growing strength of the Ministry's regional operations is reflected in the greatly increased number of inspections and pollution control measures carried out in the field during the fiscal year.

During the year 1,940 inspections were made of the 1,440 water works systems in the Province, compared with 1,172 inspections made last year. Another 1,419 inspections were made at 779 sewage works in Ontario, compared with 1,101 inspections carried out in 1974-75.

The number of septic tanks inspected decreased from 10,359 in the previous year to 7,794, reflecting the takeover of part of the program by Health Units. Checks on pleasure craft and marinas increased from 2,438 in 1974-75 to 3,114 this year.

To determine the effectiveness of pollution control measures and to locate pollution sources, 363 municipal pollution surveys were undertaken. In recreation areas, 8,898



cottage properties were inspected, compared with 6,085 last year, to detect malfunctioning systems.

The waste management program entailed 5,003 inspections of 2,355 sites and systems. This can be compared with 2,865 inspections made in the first year of regional operations. This program includes approval, inspection and promotion of sanitary landfill sites, incinerators, processed organic waste disposal sites and systems, and derelict motor vehicle sites. The major thrust of the program is to bring about the development of new and improved waste facilities and then close down inadequate sites.

Complaints received from the public are valuable in detecting violations. During the year, 4,440 complaints were received and investigated.

In the planning field, staff reviewed plans respecting water and sewage facilities on 1,389 proposed subdivisions, 6,926 lot severances, and official plans and amendments, to ensure against potential pollution or water problems.

Industrial Abatement Section

Industrial Abatement staff in the six regions spent considerable time during the year investigating, surveying and abating some 241 major industrial sources. This was nearly double the number dealt with in 1974-75, indicating that the year-old regional and district offices had consolidated their newly established operations. The sections also dealt with 39 significant new sources of industrial pollution.

Abatement programs are normally negotiated and set to permit time for corrective action and for delivery of pollution control equipment. Where court action is necessary, the gathering of evidence can require weeks of painstaking work by specially trained field personnel and the use of sophisticated monitoring devices and physical and chemical analysis. New technology has enabled detection devices and methods of analysis to become increasingly more efficient. Table III indicates that the Ministry dealt with 24 court cases relating to industrial sources during 1975-76 and issued 27 control or amending control orders. Ministry smoke emission cut-back orders under the Air Pollution Index totaled 17.

In connection with Ministry control and abatement orders

and programs, industrial sources in the Province spent or committed \$177.5 million in capital funds for pollution control. This sum was up 25 per cent over the previous year's expenditures, indicating increased environmental consciousness.

In addition to other activities, Industrial Abatement sections provided a 24-hour first-line engineering assessment and co-ordinating function under the Ontario Contingency Plan for 912 accidental spills of oil and other hazardous substances. This 27 per cent increase in the number of spills over the previous year is a reason for Ontario calling for more stringent safeguards in handling hazardous substances and demanding stricter marine controls on the Great Lakes through the International Joint Commission.

As Table III illustrates, the number of complaints received and investigated in 1975-76 totaled 6,746, most of which concerned odour, smoke or emission of particulate matter or dust. Farm visits under the Certificate of Compliance Program was up sharply over the previous year, totaling 684.

Utility Operations Sections

These sections continued to supervise, operate and regulate water and sewage works financed and constructed by the Ministry under agreement with the municipalities served.

As at March 31, 1976, there were 249 such facilities (83 water and 166 sewage) operating in 246 municipalities requiring a total of 524 plant operators on staff. This compares with 219 facilities (75 water and 144 sewage) operating in 218 municipalities requiring a total of 445 plant operators in the 1974-75 fiscal year.

Approximately \$160 million were invested in water and sewage capital works in 1975-76 resulting in a total capital cost for all Ministry-operated projects of \$760 million.

Graph V shows the distribution of operating costs for the year ending March 31, 1976 and Graph VI shows the growth in the number of projects operated by the Ministry for municipalities.

Technical Support Sections

During the year, Technical Support Sections in the regions completed their staffing in the four subsections: Air Quality

Assessment, Water Resources Assessment, Approvals and Planning and Laboratory Services.

Staff dealt with a wider variety of investigations, evaluations and reports which varied considerably from region to region depending on the prevalence of specific problems. The sections published 41 formal reports on a variety of subjects, including major recreational lake and river basin surveys, ground water surveys and air quality surveys.

Air Quality Assessment

Air Quality staff maintain over 1,100 air monitoring installations across the Province, measuring particulate matter, sulphur dioxide, fluorides and other air contaminants.

In the two northern regions, all vegetation and soils evaluations are carried out by regional staff, with 69 complaints investigated during the year. In the southern regions, phytotoxicology problems are handled by the Air Resources Branch.

Water Resources Assessment

During the year the staff carried out a number of waste assimilation studies, comments on 272 water and sewage works, 65 landfill applications and 307 applications for water impoundment, marine construction and pit and quarry proposals. In addition, staff investigated 545 complaints, most of which concerned well interference and well pollution problems. The six regions operated and maintained a network of water quality stations totaling 155 streamflow stations, 559 water quality stations and 283 observation wells.

Approvals and Planning

Staff dealt with 539 non-complex air approval applications and reviewed 255 more complex applications which were forwarded to Head Office for approval. Water taking permits issued totaled 525. The Planning staff commented on 364 official plans and amendments and 755 subdivisions. In two of the regions, the subdivision comments were co-ordinated by the Municipal and Private Section staff and are not included in these figures.

Laboratory Services

Regional laboratories at Kingston, London and Thunder Bay processed a greatly increased number of samples (see Table below). The increase in productivity was most marked in the Kingston Laboratory as this Unit moved from a van to a properly equipped laboratory accommodation.

<u>Region</u>	<u>1974/75</u>	<u>Microbiology</u>	<u>Change</u>
		<u>1975/76</u>	
S.W. Samples Rec'd. Tests Completed.	11,608	14,036	+21%
N.W. Samples Rec'd. Tests Completed.	7,620	9,051	+19%
S.E. Samples Rec'd. Tests Completed.	5,020	7,539	+50%
	15,787	24,944	+58%

<u>Region</u>	<u>1974/75</u>	<u>Chemistry</u>	<u>Change</u>
		<u>1975/76</u>	
S.W. Samples Rec'd. Tests Completed.	13,961	17,101	+22%
	118,048	157,946	+34%
N.W. Samples Rec'd. Tests Completed.	7,042	8,840	+26%
	51,806	62,415	+20%
S.E. Samples Rec'd. Tests Completed.	4,057	6,965	+74%
	16,893	48,327	+187%

laboratory services branch

This Branch continued to provide analytical support to the Ministry's environmental quality assessment and pollution abatement programs, and to undertake research projects aimed at clarifying the interaction of aquatic and atmospheric contaminants with the environment, and their possible effect on the quality of human life.

A total of 1,682.9 thousand tests were performed by the central and regional laboratories during the year, about 20 per cent more than the previous year. Regional laboratories, in Kingston, London and Thunder Bay, increasing their output by 41 per cent, took over a larger share of the work load (22.2 per cent in 1975-76 cf. 18.7 per cent in the previous year). The growing interest in trace metals and organic contaminants is reflected by the large increase in tests performed by the two trace contaminants sections (Table IV).

The Ministry's regular programs were the major users of laboratory services accounting for 73 per cent of the tests performed, while the International Joint Commission programs accounted for 16 per cent of services. The remaining tests went for the support of special projects (see Table V and Graph VII).

While testing air, water and waste water quality remained the major task of the laboratory, special attention was given to a number of problem areas, such as various aspects of mercury pollution, toxic trace metals such as lead, arsenic and selenium, pesticides and PCBs, polycyclic aromatic hydrocarbons, organics in drinking water, vinyl chloride, freons in air, etc. Recognizing the important role the sediment plays in the environmental processes, considerable effort was invested in developing a capability for meaningful sediment analysis. Similarly, a detailed assessment of physical and chemical methods which would make a comprehensive air quality evaluation possible, became one of the important objectives of the Branch's method development program. In this regard, asbestos required special attention, as the potential health hazard associated with this substance found in both air and water caused serious concern and prompted efforts to develop an asbestos analysis method based on electron microscopy.

The discovery of the correlation between dissolved oxygen

concentration and the depth of lakes led to further studies of this phenomena, as it is known that oxygen concentration distribution patterns seriously affect aquatic life. The identification of a number of halogenated compounds in drinking water directed the attention to the use of chlorine as a water and waste water disinfectant and studies to clarify the chemical processes involved were initiated. The continuing interests in the restoration of acid lakes led to investigations of the effects of pH changes on the distribution and availability of trace metals and nutrients as prerequisites of aquatic life. Laboratory staff provided the analytical services required in the above-mentioned investigations.

The wide range of problems requiring attention compared to the limited resources of the laboratory indicated the need for realistic priority setting and systematic organization of R & D activities. A system has been implemented requiring a preliminary plan for any major undertaking with well defined objectives, work programs, manpower requirements and cost estimated. During 1975-76 the laboratory staff initiated 76 scientific projects, while contributing to several others initiated outside the Laboratory Services Branch.

More than 50 new and/or modified analytical procedures were introduced and several others improved during the year. All new methods went through a systematic validation process before implementation.

Spectrography made its initial entry into the field of multielemental and diagnostic analysis. The solution technique using rotrode excitation proved to be a valuable screening technique and a semiquantitative multielemental analysis method. A long-term program to explore the special capabilities of this computerized instrument is under way. Its limitations in diagnostic elemental analysis is compensated by the special capabilities of the non-destructive X-ray fluorescence technique, which was primarily used for the determination of sulphur in vegetation samples during the year.

The Gas Chromatography-Mass Spectrometry-Computer System provided the laboratory with the capability of identifying organic compounds. The technique first used by the laboratory to verify the identity of methyl mercury determined by electron capture gas chromatography has gradually been applied to the identification of pesticides, PCBs and haloforms in drinking water and a series of other suspected and unsuspected pollu-

tants. The analysis of environmental samples for organic constituents acquired a new dimension by the application of this technique.

High pressure liquid chromatography gained renewed recognition as the best technique to separate non-volatile compounds. Coupled with a spectrofluorophotometer, it was used for the determination of soluble carbonyl compounds, dicarboxylic acids and polycyclic aromatic hydrocarbons.

The laboratory's two electron microscopes permit the individual examination of very small particles. The transmission electron microscope was used exclusively for asbestos analysis, while the use of the scanning electron microscope for combined morphological and chemical analysis of individual particles has not yet been fully explored, but initial tests indicate a great potential in producing information on the composition of air particulate and water-suspended materials.

Many of the results of the R & D work carried out by the laboratory are of special interest for the users and in general for the scientific community. Such results were summarized in Ministry reports, many of them published or presented at various conferences. A total of 23 papers and 65 reports were prepared by the staff during the year.

The Laboratory Services Branch is gaining international recognition and scientists from the United States, Sweden, New Zealand, Libya, Hungary, United Kingdom, West Germany, Mexico, etc., visited the laboratory and initiated information exchange.

northwestern region

Regional Director: L.F. Pitura

Programs in Northwestern Ontario are chiefly administered through offices in Thunder Bay and Kenora. The region is vast, much of it covered with forest and sparsely populated except for a number of major centres. The livelihood of the majority of the inhabitants springs from the primary resource and tourist industry. Due to the climate, geology and population distribution, and the fact that much of the area is municipally unorganized, many of the environmental problems faced are

unique and require considerable ingenuity to arrive at acceptable and economic solutions.

Two major concerns during the year were the presence of asbestos in the Thunder Bay water supply and the longer-term question of the impact of mercury previously discharged to the Wabigoon-English River system. As the City of Thunder Bay undertook to construct a modern water filtration plant, there should be no continued public concern of a health hazard due to the presence of asbestos. While it was not possible to resolve the problem of mercury contamination in the river system, much data was collected that helps evaluate the extent of the problem, rate of recovery through natural processes and, hopefully, in the future will assist in the evaluation of proposed remedial measures.

As a result of Industrial Abatement Section activities during the year and the preceding fiscal year, \$47 million in pollution abatement facilities were approved for the region's industries over the 1975-76 period. This sum included \$28 million in the forest industry, \$9 million in the mining industry and \$9 million in the Thunder Bay terminal grain elevators.

Highlights of these programs were approval of the closed cycle effluent system for the new kraft mill being constructed by Great Lakes Paper Company in Thunder Bay; approval of pollution control facilities for the new Pluswood Ltd. particle board plant in Atikokan and the new Umex base metal mine in Pickle Lake. Also, air pollution controls were approved for the iron ore reduction plant being built by the Steel Company of Canada at Griffith Lake, Ear Falls, and facilities to control arsenic oxide emissions from the roasting operation at the Dickenson Mines gold mine, Balmertown. Completion of pollution abatement facilities for emissions from the terminal grain elevators over the next few years will eliminate a major air pollution problem in Thunder Bay which has been of concern for many years.

All municipal water systems and all sewage works in the region were inspected during the year. Major progress was made in Thunder Bay with commencement of construction of a 24 million gallon per day sewage works and several major sanitary sewer interceptors to serve developing areas and eliminate direct discharge of sewage to area waters as had occurred in the past.

Staff also continued with a cottage pollution control program on recreational lakes. During the year, over 1,200 cottages and commercial establishments were investigated. Cottagers have been quick to respond to staff recommendations with the result that pollution from such sources is considered controlled and no threat to water quality in the areas surveyed.

Collection of derelict motor vehicles was initiated at Dryden and Kenora, where 741 vehicles were collected and hauled away for recycling. This project, "Project Remove", has been very successful in accomplishing its goals.

During the year, new sewage treatment plants at Schreiber and Geraldton were placed in operation, and also water supplies at Ignace and Vermillion Bay.

Major water quality studies were undertaken on Lake of the Woods, Manitouwadge chain of lakes, Thunder Bay Harbour and the Wabigoon, English and Winnipeg River system. Follow-up on previous lake studies was completed and a number of surveys carried out on recreational lakes.

Sample load to the Thunder Bay laboratory again increased by approximately 25 per cent over the previous year. Approval was granted for construction of a much needed new Regional laboratory and construction began in March 1976, with completion scheduled for April 1977.

northeastern region

Regional Director: R.E. Moore

The activities in this Region increased considerably following the Ministry reorganization a year earlier.

The number of air monitoring instruments in the Region were increased by 35 per cent to total over 200. A new Air Pollution Index Station was established in New Sudbury in January 1976. An efficiency of over 90 per cent valid data was maintained at most stations.

Several major watershed studies were undertaken in the Region, including Lake Temiskaming, Junction Creek, Serpent

River and Round Lake. Mercury studies in fish and lake sediments were also initiated.

All facets of the Sudbury Environmental Study were fully integrated under a full-time co-ordinator in September 1975.

Industrial abatement activities included the installation of waste water treatment facilities on Copper Cliff and Nolin Creeks, a water clarification system at International Nickel Company's Garson Mine and a recycle of tailings pond decant at Falconbridge's Levack Mill. A commitment was received from Eddy Forest Products for a \$9 million hot stack refining-oxygen bleaching project at its Espanola mill; an environmental improvement project was initiated on a smelter at Falconbridge Nickel Mines; and a Control Order relating to air emissions was issued to Algoma Steel with reference to its Sault Ste. Marie mill. The Ministry funded a joint study with the Ministry of Energy to utilize wood wastes to generate energy from saw mills in the Hearst area.

A survey of all active and inactive uranium mining properties was carried out in the Elliot Lake area to provide the basis for Control Orders.

There was also a significant increase in the activities of the Municipal and Private Abatement Section which undertook surveys of 3,000 cottage properties, a 15-fold increase over the previous year. Complaints handled were up 50 per cent, and attributed to an increasing awareness of Ministry presence in the Region. Meetings attended by staff almost doubled in number. Boating and marina inspections tripled over that of the previous year.

The derelict motor vehicle program, "REMOVE", was enthusiastically adopted by a large number of communities in the northern part of the Region.

The Utilities Section operated or administered a total of 52 treatment facilities, including 18 waterworks and 34 sewage treatment plants.

Five new water treatment plants were brought into operation to serve the communities of Bruce Mines, Latchford, Verner, Callander and Manitowaning. Six new sewage treatment facilities were built to serve Bruce Mines, Latchford, Verner, Webbwood, Callander and Manitowaning.

An expansion to the North Bay Water Pollution Control Plant doubled its capacity from four to eight million gallons per day.

southwestern region

Regional Director: D.A. McTavish

Continued progress was achieved in many of the abatement programs of the Southwestern Region. Recently commissioned industrial waste treatment facilities at Imperial Oil Enterprises and the development of a program for controlling waste discharges from Polysar Limited in Sarnia have contributed to a decrease in the discharge of contaminants to the St. Clair River.

In view of mercury contamination of sediments in the St. Clair River, the Ministry has prohibited disposal by transfer to other parts of the river bottom of dredgings removed from areas where the mercury content of the sediments is considered to be excessive. The St. Clair River Parkway Commission has co-operated with the Ministry in allowing the placement of mercury contaminated sediments behind sheet piling located along the shoreline.

In the Windsor area a decrease in the contaminants discharged to the atmosphere was achieved at several industries located in the area. Major changes at the Ford Motor Company works resulted in a reduction of approximately 50 per cent in the suspended particulate matter discharged as compared to previous years. A similar reduction in the emissions of fluoride from the Allied Chemical plant in Amherstburg was also experienced during 1975.

The J.C. Keith Generating Station, owned by Ontario Hydro has in the past been responsible for elevated levels of SO₂ and particulates in the vicinity of the plant. During 1975, Ontario Hydro announced a decision to close the station for at least 30 months. Ontario Hydro has been informed that stringent requirements for air quality protection must be met prior to the start-up of the plant should it be necessary to resume production of power at the station.

The memorandum of understanding on transboundary air pollution control signed by the Premier of Ontario and the

Governor of Michigan has continued to benefit the air pollution control programs of both Ontario and Michigan, and has especially served to improve air quality for Windsor residents. The memorandum establishes a mechanism to integrate the air quality monitoring data generated on both sides of the international boundary and provides an opportunity for each agency to be regularly brought up to date on the status of air pollution sources and abatement action.

One of the first areas in Canada involved in the production of oil was Petrolia. Many of the small wells have been returned to operation following the increased cost of oil. The disposal of oil field brines from these wells has been a continuing problem which has intensified with the increased operation. Several of the operators have established shallow detention ponds through which the brine flows prior to discharge to the receiving stream. These ponds have been found to reduce some of the hydrogen sulphide odour associated with the brine but have not been successful in removing other contaminants impairing the quality of receiving streams. Studies are continuing to develop alternatives to the discharge of oil well brine to surface waters.

Prior to 1976 odour complaints were received concerning the Ontario Hydro Bruce Nuclear Power Development operation. Two new water holding lagoons were constructed to serve the existing and new heavy water plants, and to provide temporary storage of water containing elevated levels of hydrogen sulphide due to process upsets. Revised operating procedures and process changes have resulted in improved control of hydrogen sulphide gas emissions.

The farm certification program is a voluntary means of assessing the environmental impact of new, remodeled or enlarged livestock facilities. The program is gaining wide acceptance in this Region as indicated by a total of 337 farm applications in the past year, which represents an increase of 68 per cent. Certificates of Compliance were issued for 87 per cent of the applications evaluated. The certification program has helped to avoid numerous situations which could have led to neighborhood odour problems, pollution of streams and costly abatement programs.

The number of unsatisfactory sanitary landfill operations continue to decline with the emergence of larger, more efficient sites. Studies for two resource recovery plants, for London and

for Windsor, were initiated during the year and in addition three area studies on solid waste handling and disposal were started. Unsuitable landfill sites were closed in Egremont, Stephen and Stanley townships, and steps taken to close the Owen Sound site. All landfill sites were inspected on an average of three times each during the year, and site operators have responded well to suggestions for improved operating practices.

The Region is a popular area for boating and as part of the boating program all marinas in the Detroit River, Lake St. Clair, Lake Huron, St. Clair River and Lake Erie areas were visited during the summer. All but one of the marinas were in compliance with regulations requiring pump-out facilities. Approximately 96 per cent of the 130 boats inspected were in compliance.

Regional staff assisted the cities of Windsor, Chatham, London, and Woodstock in their plans for the expansion of sewage treatment facilities. Major works will be constructed in each of these communities over the next few years. The impetus for expansion in many Southwestern Ontario communities resulted from the recommendations of the Thames River Basin Study published during the year and as a result staff have been involved with many communities in developing long-term plans which will enable objectives of the report to be met. Each sewage treatment facility in the Region was inspected approximately three times during the year.

Inspection of water treatment facilities in the Region indicated a high quality of water was being supplied.

Ninety-one cases of water supply interference were reported during the year. Since English common law offers no protection to subsurface interference, The Ontario Water Resources Act and related policies of this Ministry play a vital role in safeguarding ground water supplies, particularly important in the Southwestern Region where there is a pronounced dependency on ground water sources. Forty-eight cases of contamination of water wells were brought to the attention of the ground water staff and most of these were satisfactorily resolved.

Several major surface water studies were carried out to substantiate the need for improved waste treatment facilities and water quality controls. A prime example was the preparation of a report defining surface water quality and waste loading guidelines for the Kettle Creek Watershed. This report suggests

short-term alternatives for improvement of municipal and industrial discharges based on up-graded treatment and low-flow augmentation and introduced the long-range alternative of developing a common sewage pipeline to Lake Erie to serve both St. Thomas and London.

Improvements to the London Regional Laboratory resulted in improved data and reduced labour costs. The laboratory staff provided analytical support to the "Pollution From Land Use Activities Reference Group" (PLUARG). Samples originating from sites in the Region were analysed by the London lab. Also performed were the analyses required for the Great Lakes Water Quality survey program covering Western Lake Erie, Lake Huron and the connecting waterways.

In this Region the Ministry supplies water and waste water disposal services on a wholesale basis to 96 municipalities, serving a population of 690,000.

Major projects which began operation in the year were the Lambton Area Water System, which serves the western half of Lambton County including the City of Sarnia and the Harrow Water Treatment Plant which serves the Town of Harrow and the Township of Colchester South. New projects of a smaller size included sewage facilities for the Villages of Glencoe, Dutton, Comber and Paisley and the Town of Harrow. Trunk watermains were laid to supply the Town of Kingsville, and the Mitchell's Bay Water Treatment Plant was completed.

west central region

Regional Director: C.J. Macfarlane

West-Central Region staff were heavily engaged with water resources in this populous industrial area. The recovery of water quality in Hamilton Harbour was given a much needed fillip with the summertime destratification of the water using a simple and cheap aeration process. A study of Cootes Paradise, the scenic wildlife sanctuary adjoining the Harbour, was conducted to provide a basis for the design of the new Dundas Sewage Treatment Plant.

The Region was deeply involved in a practical investigation into future water supplies for the Kitchener-Waterloo area drawn from the Grand River and stored in suitable riverside soils. Less spectacular, but equally demanding work was performed in the development of water supplies and sewage treatment to serve the rapidly burgeoning industrial and municipal growth in Haldimand-Norfolk.

Substantial decreases in air contamination were measured in Hamilton and Welland. Improvements in Hamilton stemmed largely from added controls in iron and steel-making works; improvements in Welland were associated with the closing of the Union Carbide ferro-alloy furnaces. However, despite the introduction of expensive odour controls in many industrial plants, success seems often elusive since unless there is a sudden and total removal of an objectionable odour, the improvements tend to go unnoticed.

The most difficult job faced in industrial abatement is achieving substantial reduction of pollution from coke ovens without impairing the health of coke oven workers. This task is being carefully devised under the close guidance of the Ministry of Health.

The abatement of water pollution arising from the steel industry showed marked progress during the year.

central region

Regional Director: P.G. Cockburn

Extending from Halton on the west to Northumberland County on the east, and north to Huntsville and Georgian Bay, Central Region serves one of the heaviest industrialized and intensively used recreational areas in the Province.

Significant activities were the air quality improvement program in the core area along Lake Ontario, environmental control activities in recreational areas, and the waste management site development program.

In the highly developed area centering on Metro Toronto, major improvement was achieved in air pollution. The API only exceeded the maximum desirable level of 32 on two occasions.

Table VI presents the number of occasions the API exceeded the desirable level for Toronto since its inception in March 1970. Graphs VIII and IX show the reduction of SO₂ and suspended particulate matter in downtown Toronto during the past decade.

During the year 380 applications were processed related to air emissions, and evaluations involved analysis of equipment for controlling emissions of such contaminants as asbestos, lead and other heavy metals. In efforts to improve air quality, 75 violation notices and 25 orders were issued and 14 court actions initiated. Air abatement programs estimated to cost \$2.8 million were initiated at five petroleum refineries. Other air abatement programs cost 18 other industries \$7.5 million, including metal refineries, packers and asbestos-handling industries.

Odour control at Metro Toronto's sewage treatment plants was achieved by covering open tanks at three plants and the start of air treatment procedures at another. Start-up of Toronto's new Commissioner Street incinerator took place and planning commenced to replace other inadequate incinerators.

Recent introduction of improved auto emission controls and increased use of non-leaded gasoline have reduced carbon monoxide and ambient lead levels in the large urban areas. High ozone levels were monitored in rural areas outside Metro Toronto because of potential damage to agricultural crops, resulting from phytochemical reactions between hydrocarbons and oxides of nitrogen.

Intensive monitoring for airborne lead in the vicinity of five Toronto-area lead plants continued through 1975-76 while the plants installed pollution abatement equipment. Five plants using asbestos in the Region were also monitored and required to comply with abatement measures.

Major expansion of the air monitoring network during 1975 was installation of a complete monitoring station in Oakville, similar to seven other stations now operated in Central Region.

In recreational areas, control activities continued to be carried out through shore/cottage pollution surveys; self-help lake quality monitoring; lake quality surveys; official plan, subdivision and lot severance approvals; and approvals of septic tank systems. Recreational areas monitored include the Wasaga-Honey Harbour area, part of Georgian Bay, the Muskoka Lakes, the

District of Haliburton, the Kawartha-Trent corridor, Lake Simcoe and Lake Ontario.

During the summer of 1975, student summer staff inspected a total of 2,875 private sewage disposal systems on eight lakes. All cottagers with systems classified as nuisances or direct polluters were required to take corrective action. Cottagers were generally receptive, and good co-operation was obtained.

During 1975-76, 10,400 certificates of approval were issued for private sewage works and septic tanks, approximately half of which are located in sensitive recreational areas. Major water quality surveys were taken on a number of lakes, while 56 cottage associations participated in self-help water quality monitoring programs designed to maintain a continuing record of the trophic status of their respective lakes.

Four regional municipalities surrounding Metro Toronto were at various stages of completing waste management studies. In the spring of 1976, the Ministry financed a study intended to co-ordinate various area studies together with Metro Toronto's needs in an effort to establish policy guidelines for waste management programs in the central core area of the Region. Since landfill sites for garbage have become extremely scarce, the thrust of future waste management programs must of necessity relate to resource recovery and energy conservation.

In Metro Toronto, at the year end, a full-scale resource recovery plant with a 200-ton per day capacity was under construction. A 600-ton per day plant was under design for the product of a waste-derived fuel for the Lakeview Generating Station. The project, known as "Watts from Waste", is expected to be operational by 1979. Additional studies are under way for the installation of a central steam generating plant in Toronto using garbage as a fuel source.

southeastern region

Regional Director: C.E. McIntyre

The year marked the move to a consolidated regional office and laboratory in Kingston from the previous three office locations and a separately located mobile laboratory, resulting in better co-ordination and more efficient operations.

The Southeastern Region is known for its abundance of recreational lakes, as well as the Ottawa, Rideau and St. Lawrence River valleys. In order to establish the status of the lakes, a five-year program was initiated in conjunction with the Ministry of Natural Resources, and 49 lakes surveyed during the year. Through definition of the existing status, future use of each lake as a fishery and recreational resource can be established and controls implemented, if necessary, to ensure water quality is preserved.

The phosphorus removal program was almost totally initiated before the end of 1975. The few outstanding facilities are those where major construction, including phosphorus removal, is to commence shortly and where temporary phosphorus removal facilities were considered not practical.

Significant advances were made in the control of wastes from pulp and paper plants in the Region. For the first time, Domtar Fine Papers in Cornwall met the federal regulations for BOD_5 and suspended solids. The Canadian International Paper mill in Hawkesbury was on schedule with compliance on a Ministry Order. The liquid waste products from Strathcona Paper Company were covered with a Notice of Intent. Compliance with these orders will virtually eliminate the pulp and paper mills in the Region as a problem to either air or water pollution.

Field work and sampling were undertaken to collect data for the control orders to be subsequently issued to Courtaulds (Canada) and TCF of Canada, both in Cornwall. The control of these liquid emissions will virtually eliminate the problem of direct discharging industries from Cornwall.

As a result of public awareness of Ministry offices in the Region and their effectiveness in resolving problems, the number of complaints of all kinds almost doubled to 1,434 in the fiscal year. More than 85 per cent were satisfactorily resolved.

Resolution of contamination of ground water, soil and surface water by arsenic and vanadium from Masterloy Products in Ottawa was complicated by discovery that some of the waste products were also radioactive. A draft control order, prepared in co-operation with the AECB, was nearing completion to be served in the new fiscal year.

In an effort to retain the Rideau River as an excellent recreational resource in the heart of the Ottawa urban area, the first program in Ontario of storm water management was initiated. Like any new program, an information activity to convince the public and their representatives of its necessity is required and is proceeding.

The problem with municipalities not accepting their responsibilities to enforce their sewer use bylaws continued. This is most acute in high unemployment areas and smaller centres where there is a fear that enforcement might lead to the industry closing, thus putting local citizens out of work and reducing the industrial tax base.

finance and administration division

Executive Director: G.E. Higham

This Division provides a complete range of support services to the operating divisions required for the efficient operation of the Ministry. As the Ministry's central agency it has extensive responsibilities in three general areas: service, control and co-ordination.

Division responsibilities to the Ministry, to staff and to the public involve a number of central services and administrative functions, such as public information; legal advice and action; staff recruitment and payroll preparation; office services, including allocation of accommodation and printing; purchasing; systems development; and financial administration, to ensure that expenditures comply with levels set in the annual estimates approved by the Legislature.

Improved financial controls and strict attention to purchasing practices during the year reflected increased government concern about inflation and increased costs.

New planning and control systems, including computer-based recording and reporting systems, were established for capital and management programs, resulting in more effective planning and operating efficiency.

During 1975-76 the Division concentrated on providing the most efficient support possible for the Ministry's programs and activities consistent with new demands stemming from the Ministry's recent decentralization of services.

administrative services branch

The demand for administrative support services was at a level equal to that of the previous fiscal year, when the Branch underwent reorganization to cope with the increased demands from decentralization of Ministry services. Subsequent reduction in staff complement imposed a heavy work load in order to maintain an acceptable level of service. The service group most affected was the mechanical group, or the production shops, of the Operating Services Section, which are being

phased out. The exception was the Laboratory Stores Unit, which was proposed to be transferred to the Laboratory Branch of Regional Operations Division in November 1976.

During the year, the Purchasing Section's activities showed a slight increase in the number of order units processed. Processing the work has increased substantially as a result of inflation and difficulty in negotiating firm costs with suppliers.

The transfer of the Cartography and Drafting Section to this Branch provides a new service available to all divisions of the Ministry.

Systems Development

Systems development work continued in a number of areas throughout the Ministry. Branches in conjunction with System Development resources defined their information requirements, conducted feasibility studies, designed, programmed and implemented new systems. Some examples:

- The Water Resources Branch developed and implemented the Sample Information System and the Water-taking Information System and continued work on a number of water modelling projects in order to assist the Branch in managing the water resources of the Province.
- The Pollution Control Branch continued work on the utility-related information processes to assist the Branch in defining long-range capital requirements and also to control pollution loadings to receiving waters. The Branch also implemented the Revenue Control Module of the Pesticides Information System.
- The Project Co-ordination Branch developed and implemented the Utility Project Management System to help in scheduling, forecasting and controlling the building of water and sewage treatment plants.

financial services branch

The Branch provides financial services for the operating programs of the Ministry, administers the processing of transfer payments under The Pollution Abatement Incentive Act and is responsible for the financial management of the Province's investment in water and sewage projects.

Due to an increasing work load and constraints on staff complement during 1975-76, the Branch directed considerable thrust to conducting feasibility studies for the use of computer-based recording and reporting systems. This resulted in the development and implementation of a computerized program for the calculation of interest in interim financing for the Ministry's investment in water and sewage projects. Improvements were also made in reporting utility capital and operating expenditures.

The Ministry constructs, owns and in most cases, operates water and sewage projects for municipalities. To recover the capital and operating costs a service rate per 1,000 gallons is charged for actual water or sewage treated. During the year 40 rate reviews were conducted out of the 160 completed provincial projects. Due to some large rate increases mostly caused by inflationary pressures, a feasibility study was completed for an automated Utility Rate Information System. This would replace the manual systems and enable the Branch to perform annual rate reviews rather than at two to five year intervals. Development and partial implementation of this program is expected next year.

With The Pollution Abatement Incentive Act being terminated on April 1, 1976, there was increased activity in this area as well as planning for the clean-up of claims which will extend over several years.

information services branch

The Information Services Branch continued to provide a full range of communication services in fulfilling its responsibility for developing and carrying out communications needs and activities in support of Ministry programs.

The production of more than 75 news releases, in addition to brochures, reports, speeches, audio-visual presentations, promotional materials, posters and advertisements, as well as official openings and exhibitions throughout the Province, brought the Ministry's story, programs and objectives to the public.

Complete media liaison services were provided and press conferences and media interviews were arranged to encourage and promote media coverage of Ministry programs.

Regional information activities accelerated with the Regional Information Services Section and regional and district office staff being involved in media liaison, exhibit and fair activities, public speaking engagements and educational work. Twenty fairs and exhibitions were staged by regional and district offices during the year. In addition, 14 official opening ceremonies for new water treatment and sewage plants were arranged throughout the regions.

In addition to regional fairs, the Branch participated in six major exhibitions. The Ministry's three major displays were seen by an estimated 750,000 people. The Resource Recovery display, complete with a working model of the primary process recycling plant under construction in North York, was used at the Canadian National Exhibition, the Royal Agricultural Winter Fair, and the Western Ontario Exhibition, as well as at the Ontario Science Centre. The Water Quality display, using various laboratory and water quality equipment for demonstration, was shown in Thunder Bay and Ottawa. The new prefab Horticultural booth, featuring the work of the Pesticides and Phytotoxicology sections, was used at the CNE and the Flower Show in Toronto.

A more flexible publications program was effected at reduced cost with production of a range of economically produced "Fact Sheets" and a series of brief brochures on various aspects of the environment under the general title: "Who Cares About Our Environment". Publications were up-dated, reprinted and new publications planned. At year's end a total of 65 publications were in circulation, 15 of which were also available to the public in French. Over 1,500,000 Ministry publications were distributed, including technical publications, as well as a vast quantity of litter bags and promotional badges as part of the Ministry's education program.

A public education program, under the Educational Resources Co-ordinator, served Ontario's school system, environmental groups and the general public. Throughout the summer of 1976, the Ministry's "Envirovan" -- a mobile environmental information centre used in educational activities among students of all ages -- travelled the Province, visiting 13 children's camps during July and August. In the evenings the van visited seven provincial camp grounds to explain Ministry programs and show movies with a variety of environmental themes. The van visited over 20 schools in connection with environmental studies, and also took part in several professional development days for teachers.

The Creative Services Section provided graphic and photographic support to the Branch and other branches of the Ministry. Two major slide sound shows concerned with the Cottage Pollution Survey and the Environmental Assessment Program were undertaken, as well as several slide shows produced for educational programs and exhibits. The Section produced a 60-second public service announcement on Industrial Abatement for the use of Ontario TV stations, as well as a 30-second radio public service announcement for the Ministry's Mosquito Control Program. The Section provided extensive photographic evidence and aerial photography work for the Legal Branch, and also graphic and photographic work for brochures and exhibits.

legal services branch

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. During the past year there were 44 cases before the courts under The Environmental Protection Act, 12 under The Ontario Water Resources Act and seven under The Pesticides Act with the level of fines ranging up to \$10,000. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence and provides counsel to present these cases in court.

A further major involvement of the Branch is acting as counsel for any director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal. Other legal services include acting as counsel in arbitration hearings under construction contracts, advice on the appropriate application of the Ministry's powers, on the form of documents and a variety of orders which can be issued by directors under the legislation.

The Branch also provides legal advice to the operating branches and prepares Orders-in-Council, regulations, contracts and orders.

personnel services branch

So far as the staffing function is concerned, the year started with 88 vacancies and ended with 55 positions to be filled. During the year 165 employees left the Ministry and 204 were recruited.

The Branch continued to co-operate with Regional Operations training needs, and increased its delivery of programs for Ministry staff, municipal government and outside agencies. Training highlights included a comprehensive Acoustics Technology Course, Safety and First Aid Courses, and two Gas Chlorination Workshops conducted by the Branch in New Brunswick and Nova Scotia.

In keeping with the Ministry's regionalization commitment, over 300 technical staff were beneficiaries of a new classification with the introduction of the Environmental Technician class series. Classification levels recognized a unified service to Ministry clients as well as more favorable salary levels for the employees.

Environment was a "pilot" ministry for the integrated payroll, personnel, employee benefits system introduced for the first time in the Ontario Government in 1976. The system provides a co-ordinated data base on the full range of compensation information on employees.

program planning and evaluation branch

The Branch conducts operational and policy evaluation studies relating to Environmental Planning, Environmental Control, Resource Recovery and Administrative Support Services. Its primary goals are to ensure a rational allocation of available resources to programs and to assess program effectiveness and efficiency.

The Branch develops the Multi-Year Plan from conceptual stages to the annual estimates and acts as liaison with Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

Among its accomplishments in 1975-76, was the establishment of Management by Results systems for the Great Lakes Study and for the Municipal and Private Abatement Activity. Considerable improvements were also made to the systems already in use for Air Resources and the construction of water and sewage works.

Reports were completed on Subsidy Programs for Water and Sewage Works in Ontario, Transfer of Responsibility for Water and Sewage Works Construction and Services to Municipalities, and Complement Controls on Utility Management: The Recovery of Administrative Costs of Utility Operations.

A funding system was developed for Health Units administering agreements under Part VII of The Environmental Protection Act.

The Branch was responsible for preparation of the Ministry response to the Recommendations of the Special Program Review Committee. Similarly, following initiation of Supplementary Actions to the 1975 Ontario Budget, the Branch developed and co-ordinated the fiscal economies and reductions in staff complement that were called for by the Government during the remainder of the fiscal year.

internal audit branch

The Branch was primarily engaged in the performance of fiscal oriented audits, including review of the adequacy of procedures and internal controls. Operational audits were carried out in specific areas and upon request.

With the conversion of the Ministry to the "Integrated Payroll, Personnel and Employee Benefits System", late in the fiscal year, the Branch commenced an in-depth review which will be an on-going program and a major work load in future years. In addition, new audit programs with respect to Regional Offices were in the planning stage for development and testing in the 1976-77 fiscal year.

The Branch continued to review new procedures and proposed controls with staff of other branches.

boards and commissions

the environmental hearing board

Chairman: D.S. Caverly

The Environmental Hearing Board, under the authority of The Ontario Water Resources Act and The Environmental Protection Act, this year conducted numerous public hearings in communities where sites were proposed to be used for sewage treatment facilities or for landfill operations. Under the two Acts, it conducted 27 hearings concerned with sewage treatment facilities and 22 hearings regarding sites proposed for landfill operations.

In addition, the Board completed two hearings previously authorized by Order-in-Council. These concerned lead contamination in the Metro Toronto area, and the environmental implications of the Fisher Harbour development. A hearing authorized by Order-in-Council in June 1975 regarding the Ontario Hydro transmission route from near Colbeck to Limehouse was completed. These three hearings dealt with complex and controversial subjects, requiring much more time than usual for the hearing process and the preparation of reports.

In anticipation of the proclamation of The Environmental Assessment Act, 1975, and the appointment of the Environmental Assessment Board to replace the Hearing Board (which occurred April 20, 1976), the Hearing Board and its staff, because of their experience with the requirements of the public hearing process, made preliminary arrangements and prepared prototype notices, forms, and other documents for the use of the Assessment Board. This was done in order that the Assessment Board would be able to conduct the public hearings authorized under The Environmental Assessment Act as soon as they were required.

the environmental appeal board

Chairman: I.W. Pasternak, Q.C.

During the fiscal year, 36 appeals pursuant to The Ontario Water Resources Act and The Environmental Protection Act, were received by the Environmental Appeal Board. This represents an increase of more than double the number of appeals received during the previous fiscal year and was, in part, a reflection of 1973 amendments to The Environmental Protection Act which allow for the appeal of decisions regarding private sewage systems.

Seventeen appeals were dealt with during 21 days of hearings conducted by the four members of the Board. One hearing of major significance dealt with the Municipality of Metropolitan Toronto appeal from the refusal of the Ministry to approve the Brock North waste disposal site in the Town of Pickering for the disposal of garbage from Metro. The majority of hearings concerned private sewage systems, with appeals regarding waste disposal sites and noise and air pollution matters being less numerous.

the waste management advisory board

Chairman: R.H. Woolvett

During 1975-76, its first full year of operation, the Waste Management Advisory Board launched a number of activities directed at fulfilling its broad mandate of advising the Minister of the Environment on any matter related to the management of waste in Ontario.

The Board has been particularly interested in ensuring that it obtains information from as many sources as possible to assist it in receiving and analysing the viewpoints of all sections of the community. With this policy in mind, it has met

with representatives from industries involved in the Board's areas of interest, with municipal officials, research bodies, consumers' associations and citizens' groups on many occasions.

An important area of Board effort during this time concerned carbonated soft drink containers. The Board carried out a monitoring program to determine the availability of refillable containers for carbonated soft drinks; held on-going discussions with container and soft drink manufacturers and retailers to encourage their co-operation in achieving the objective, and carried out a study to examine the problems of float equity, as they apply to the use of standard refillable bottles. In March 1976, the Board submitted a report to the Minister, entitled "The Carbonated Soft Drink Container in Ontario."

Further, in the soft drink area, the Board recommended to the Minister, in August 1975, that single-use containers for carbonated soft drinks manufactured of plastic or aluminum or glass (larger than 1.5 litres) not be allowed for sale in Ontario without prior approval from the Ministry of the Environment. This recommendation was adopted and embodied within Regulation 998/75, under The Environmental Protection Act, 1971. This Regulation became effective on January 1, 1976.

In other beverage container areas, Board activities include studies into milk packaging and wine and spirits packaging. In February 1976, an interim milk packaging report was submitted to the Minister, containing data on current use patterns and market trends for fluid milk containers in the Province. It also contained a Board recommendation to encourage the continued use of the three-quart refillable milk jug. Research into wine and spirits packaging was still in hand at the end of the fiscal year.

The dearth of reliable information across the Province on the quantities of municipal waste generated and its composition was recognized by the Board as being a hindrance to the fulfilling of many of its functions. As outlined in its terms of reference, these functions include: "reporting to the Minister on the effect of government directives and regulations imposed to achieve a reduction in the generation of solid waste," and "examining the priorities which should be allotted to programs of research and development, related to the reduction of waste and to resource recovery from waste." Accordingly, the Board undertook to develop reliable per capita generation figures for residential, commercial and industrial wastes collected and

disposed of by municipalities and private agencies through the Province. It also undertook to obtain an approximation of the composition of waste being generated at the residential level. This study was still in hand at the end of the fiscal year.

Other Board activities initiated during this time period included a literature search concerning glass markets; discussions with Environment Canada and the Ministry of Industry and Tourism, regarding the development of an industrial waste materials exchange program; and research into residential separation-at-source techniques.

the pesticides advisory committee

Chairman: Dr. D.N. Huntley

The Committee, established in 1970 under The Pesticides Act, reviews annually the content and operations of The Pesticides Act, inquires into matters concerning pesticides and the control of pests, and reviews publications of the Ontario Government about pesticides and pest control, and reports thereon to the Minister of the Environment.

Mr. Keith Laver, Chairman of the Committee since its inception, resigned in February 1976 and was succeeded by Dr. D.N. Huntley. The Committee consisted of 13 members drawn from agriculture, industry, universities and government.

The Committee reviewed the characteristics of 241 new pesticide products and recommended for each a classification for storage, sale and use in Ontario.

All the 1975-76 publications of the Ministries of Agriculture and Food, Environment and Natural Resources, concerned with pesticides, were reviewed prior to printing and distribution.

A report by the Committee on the availability and dependency of personal protective equipment for pesticide users was published in 1975 and received wide distribution through the Pesticides Control Section.

The Committee reviewed 37 research project proposals from universities and recommended that the Ministry fund 22 projects at a total cost of \$136,017.

In 1975-76 OPAC held 21 full committee meetings as well as numerous subcommittee meetings involving particular members. In all, about 500 man days of work was expended.

As residential growth encroaches upon existing farms, complaints by area residents about farm odours increase: those not settled by Ministry officials are referred to the committee, which in nearly all cases has found a solution acceptable to both parties.

In 1975-76, five farms were visited at the request of the Ministry. Two were judged to be operating in a satisfactory manner: the other three received recommendations regarding manure storage and dead stock disposal. The Committee files a report on each visit. Recommendations of the Committee are delivered to the farmer through the Ministry.

the pesticides appeal board

Chairman: J.R. Swanborough

During 1975-76, six appeals were received by the Pesticides Appeal Board and two hearings were held. Since most of the appeals were received near the end of the fiscal year, they were scheduled for the following year.

the farm pollution advisory committee

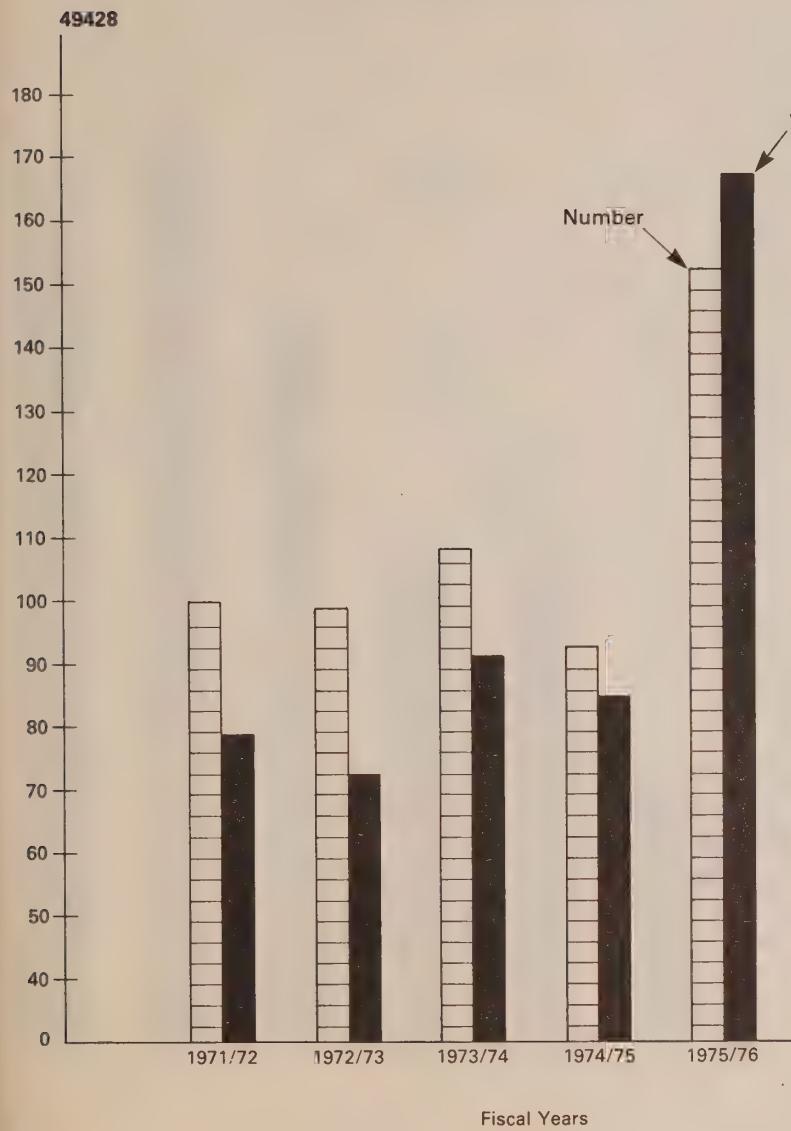
Chairman: Otto Crone

The Farm Pollution Advisory Committee is comprised of four Ontario farmers, Otto Crone and Harold Eubank of Hagersville, Donald Switzer of Smithville and John Peart of Caledonia. Its primary concern is to provide objective assessments of farm environmental situations. When requested by Ministry officials, the Committee visits farms to make recommendations to the farmers about normal farm procedures, for example, manure storage, spreading and cultivation, drainage of yards and ventilation of livestock and poultry buildings.

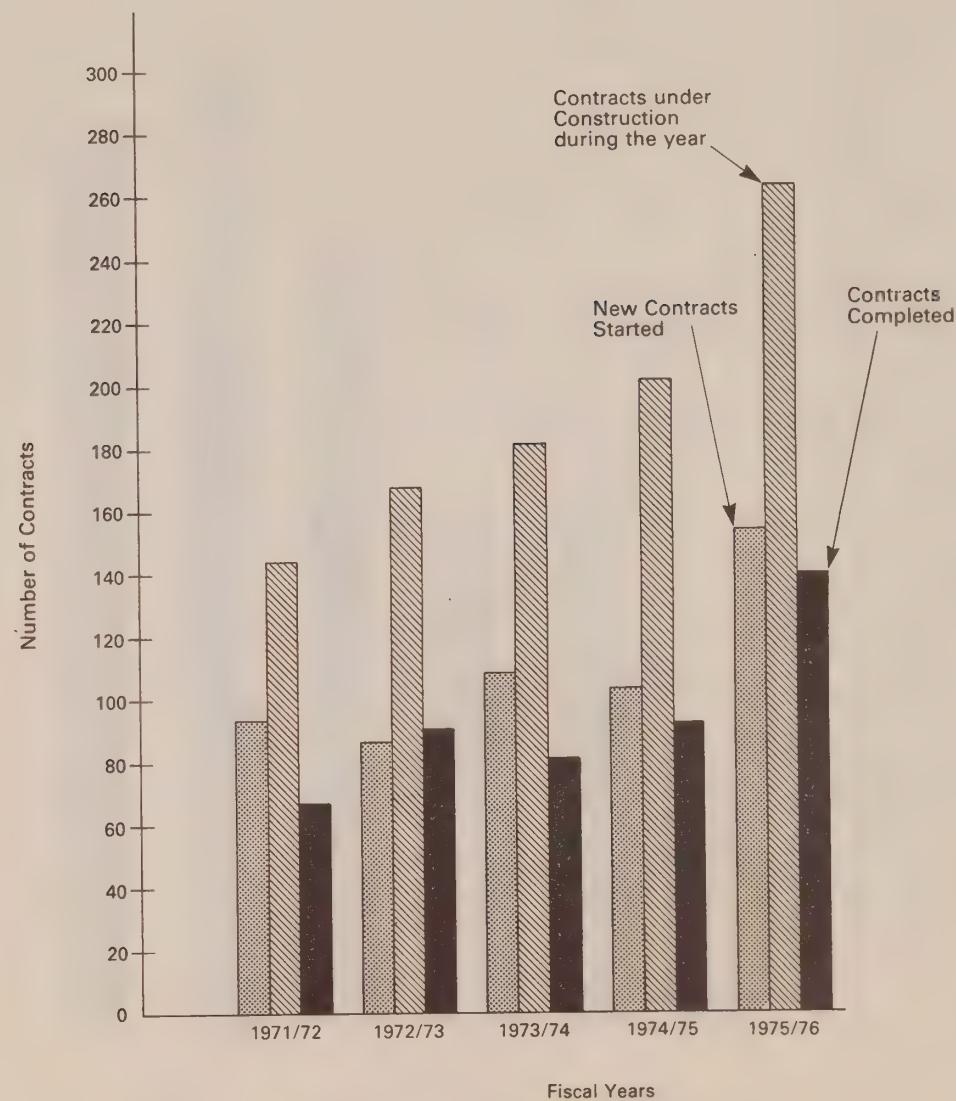
NUMBER AND VALUE OF CONTRACTS TENDERED ANNUALLY
(1971/72 to 1976/77)

APPENDICES

ANNUAL VOLUME OF ACTIVITY
(1971/72 — 1976/77)

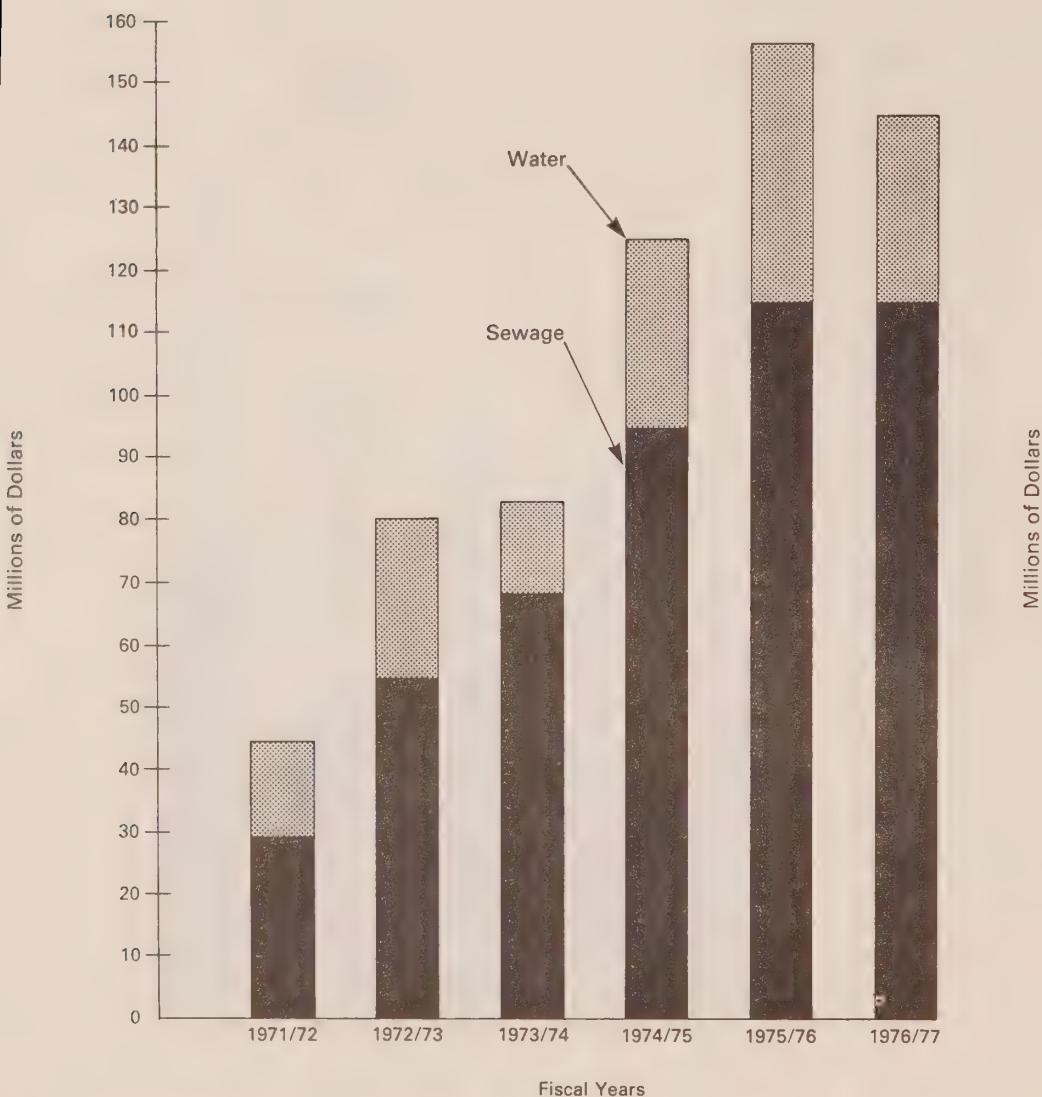


GRAPH I

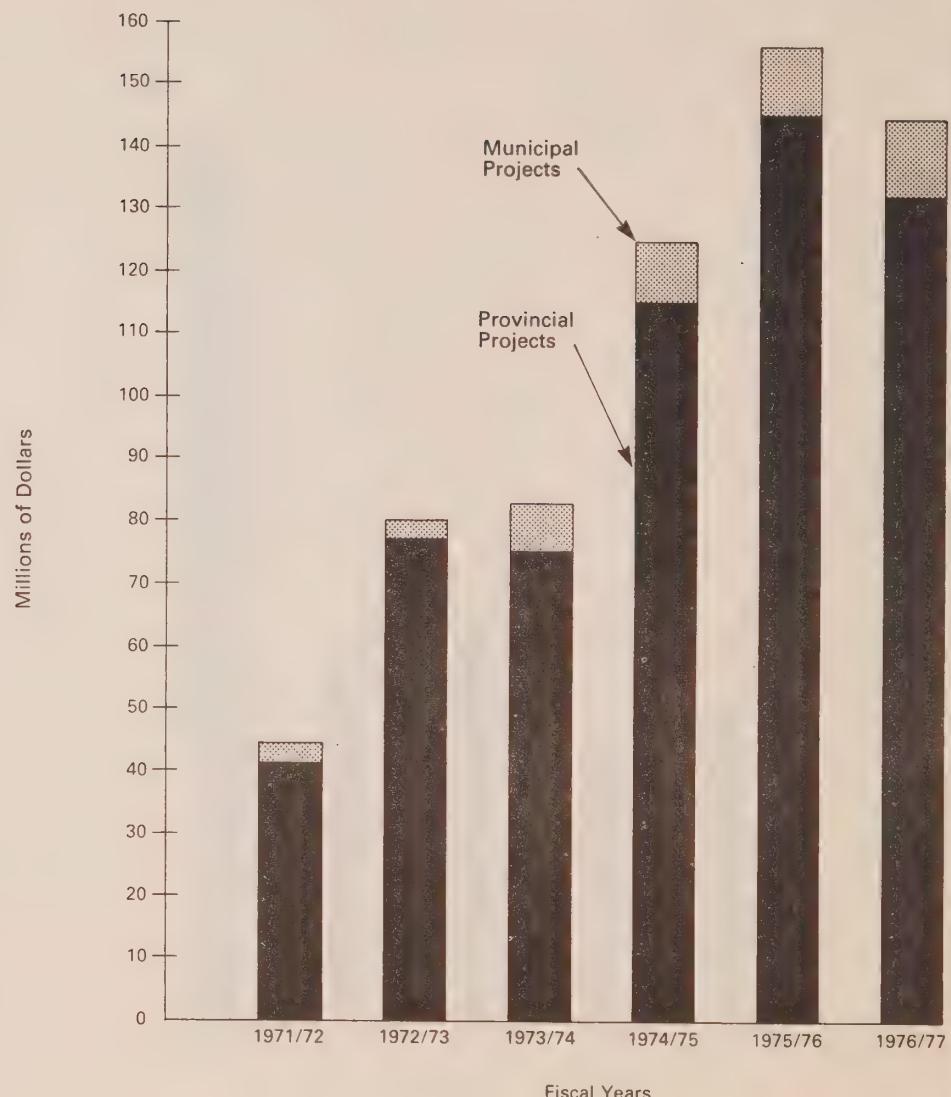


GRAPH II

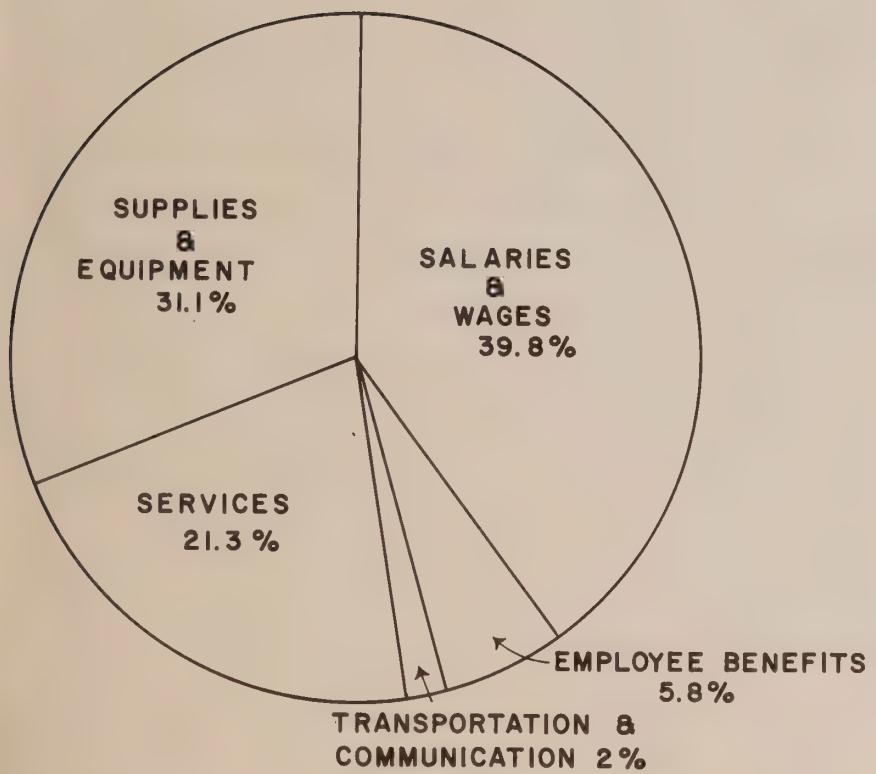
ANNUAL TOTAL EXPENDITURE BY PROJECT TYPE
(1971/72 — 1976/77)



ANNUAL TOTAL EXPENDITURE BY CLASS
Capital Construction Program
(1971/72 — 1976/77)

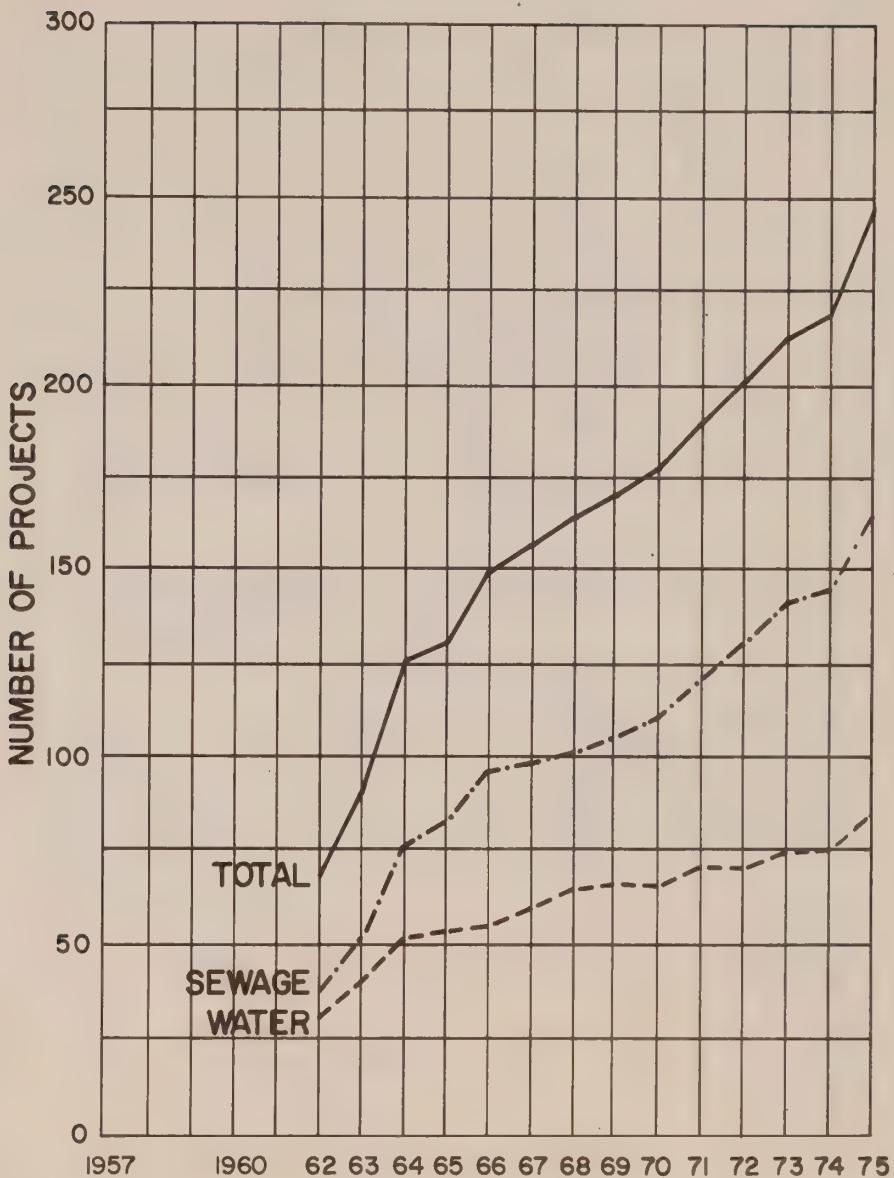


DISTRIBUTION OF
OPERATING COSTS
FISCAL YEAR 1975-76



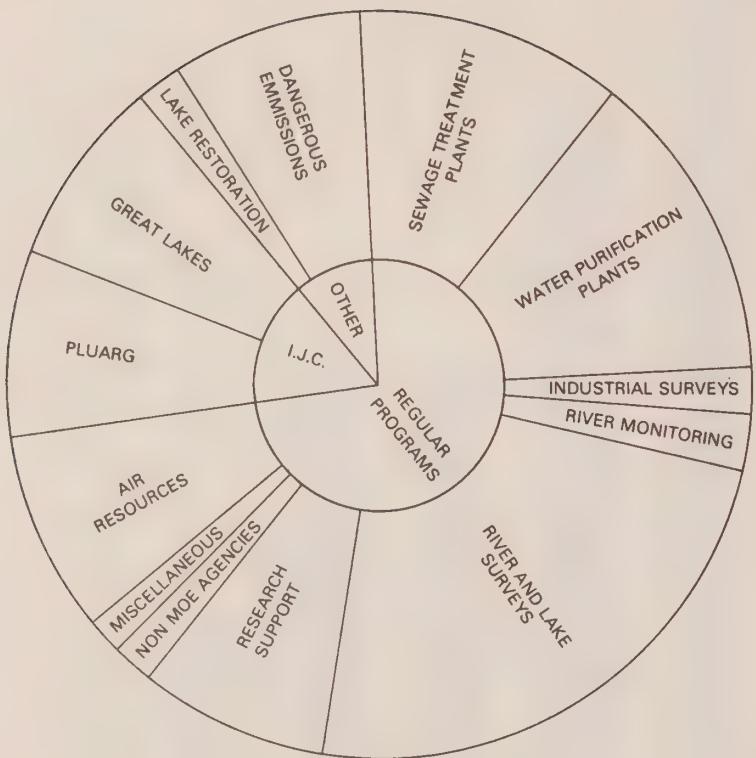
GRAPH V

PROJECTS IN OPERATION

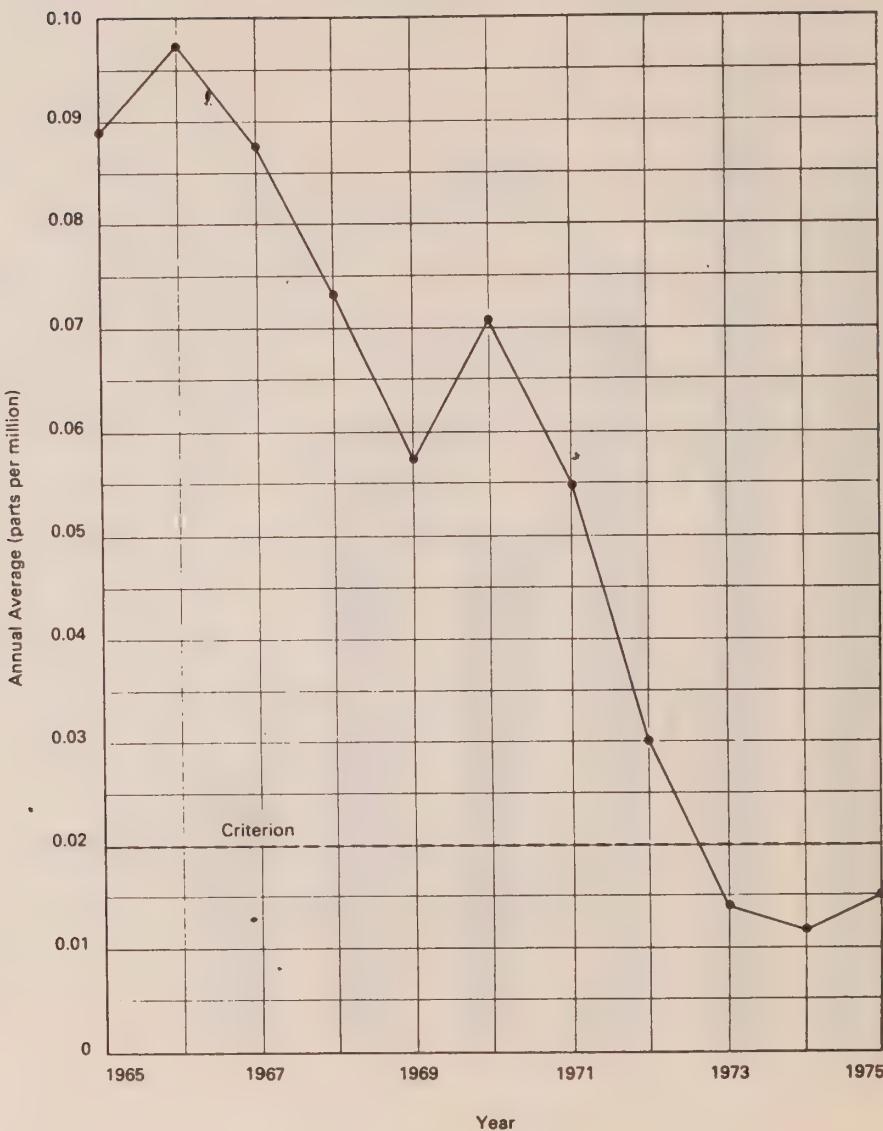


GRAPH VI

TEST DISTRIBUTION BY PROGRAMS



SULPHUR DIOXIDE IN DOWNTOWN TORONTO

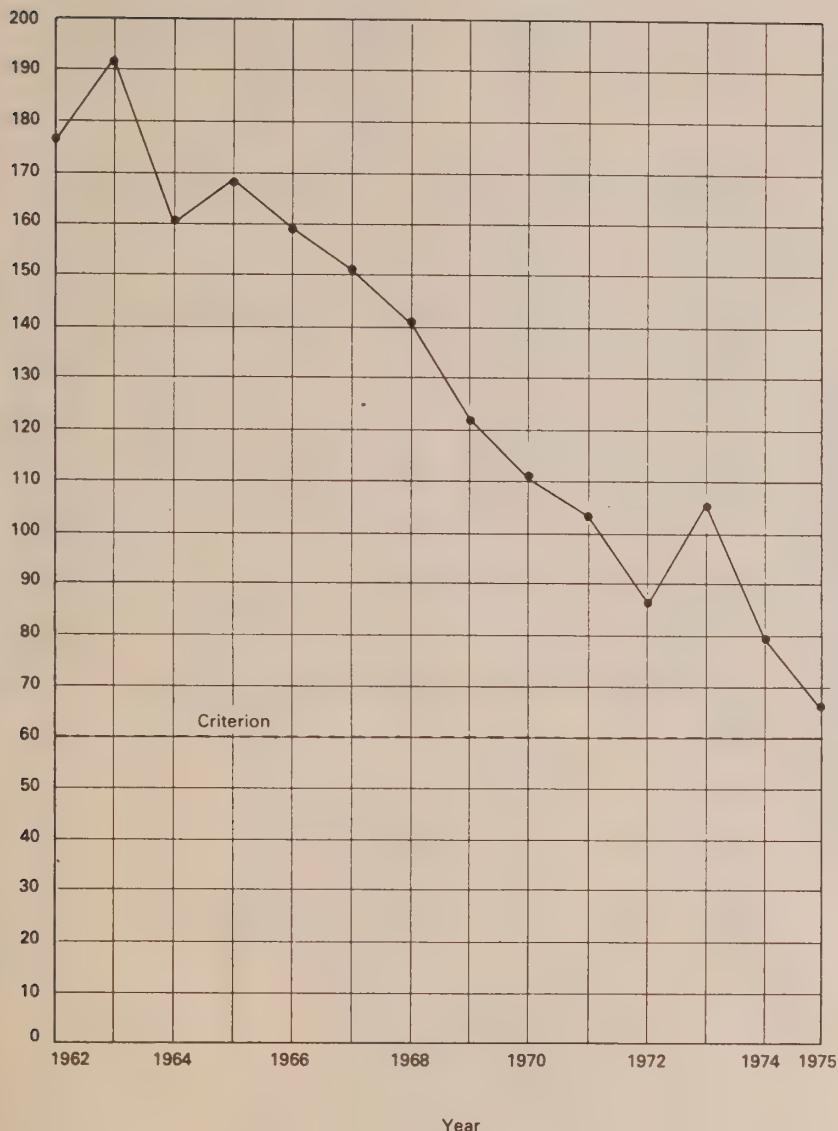


GRAPH VII

GRAPH VIII

SUSPENDED PARTICULATE IN DOWNTOWN TORONTO

Annual Geometric Mean (mg/m^3)



GRAPH IX

TABLE I

INDUSTRIAL APPROVALS SECTION

Applications for Approval Processed

1975-76

(To March 31, 1976)

	<u>Received</u>	<u>Approved</u>	<u>Cancelled</u>	<u>Denied</u>
Air	688	686	54	5
Water	108	111	9	-
Waste	<u>126</u>	<u>120</u>	<u>2</u>	<u>-</u>
Total	922	917	65	5

TABLE II

PROJECT CO-ORDINATION BRANCH

The volume of activity of the Capital Construction Program during the 1975-76 fiscal year is indicated by the following statistics:

1) Capital Expenditure	\$ 154,939,000
Sewage Works	\$ 114,783,000
Water Works	\$ 40,156,000
Provincial Projects	\$ 145,206,000
Municipal Projects	\$ 9,733,000
Provincial Subsidy	\$ 62,800,000
Ditto. as % of total expenditure	% 40.5

2) New Projects

Provincial Projects

New Applications Received		18
Final Agreements Executed		24

Municipal Projects

New Applications Received		10
Preliminary Agreements Executed		7
Final Agreements Executed		12

3) Construction

Contracts Tendered	- No. \$ Value	153 \$ 167,520,000
--------------------	-------------------	-----------------------

Contracts Started	- No. \$ Value	153 \$ 169,047,000
-------------------	-------------------	-----------------------

Contracts Completed	- No. \$ Value	139 \$ 110,291,000
---------------------	-------------------	-----------------------

Contracts Under Construction During the Year		262
---	--	-----

Average number of Contracts Under Construction in each month		127
---	--	-----

4) Grants to Regional and Restructured
Municipalities

No. of Municipalities Participating		14
-------------------------------------	--	----

Value of Grants Paid		\$ 10,429,000
----------------------	--	---------------

TABLE III

MINISTRY OF THE ENVIRONMENT
SUMMARY OF INDUSTRIAL ABATEMENT ACTIVITIES
FOR THE FISCAL YEAR 1975-76

	North West	North East	South West	South East	Central	West Central	Total 75/76	Total 74/75	% Diff.
Number of Complaints	218	369	1,081	540	3,317	1,218	6,743	7,642	-11.8
Control & Amending Control Orders	4	1	3	0	8	11	27	27	0
Program Approvals	2	1	2	0	1	6	12	18	-50
Ministry Order API	0	0	0	0	17	0	17	16	+ 6.25
Farm Visits									
Certificate for Compliance Program	1	0	342	50	107	184	684	498	+37.4
Spills	37	299	135	112	221	108	912	719	+26.8
Court Cases	0	0	2	2	13	7	24	40	-40
<u>COMPLAINTS</u>									
Odour	64	121	353	182	1,466	613	2,799	2,948	- 5.
Smoke	30	79	171	87	1,032	152	1,551	1,977	-19.1
Particulate/dust	83	65	264	108	523	239	1,282	1,593	-19.5
Agricultural	2	0	104	26	29	42	203	250	-18.8
Noise	17	28	97	57	22	31	252	256	- 1.6
Water	10	57	71	73	193	50	454	431	+ 5.3
Other	12	19	21	7	52	94	205	247	-17.
TOTAL							6,746	7,642	-11.7
<u>CAPITAL COSTS</u>									
\$MM	46	29.5	38	11.3	20.8	31.9	177.5	142	+25.

TABLE IV

LABORATORY SERVICES BRANCH
NUMBER OF TESTS PERFORMED

Laboratory Unit	Tests x 1,000	1974-75	1975-76	% Increase	Remarks
London Regional Lab.	157.5	209.0	32.7		
Thunder Bay Regional Lab.	74.7	91.1	22.0		Regional Labs. up 41%
Kingston Regional Lab.	32.7	73.3	124.2		
Water Quality Section	737.6	816.5	10.7		
ITC Section	94.3	141.8	50.4		
OTC Section	23.2	49.9	115.1		
Air Quality Section	131.9	122.3	- 7.3		
Microbiology Section	165.6	179.0	8.1		
LABORATORY SERVICES BRANCH TOTAL	1,417.5	1,682.9	18.8		

TABLE V

LABORATORY SERVICES BRANCH
WORKLOAD BY PROGRAMS

Program	Tests x 1,000	1974-75	1975-76	% Change	1974-75	% of Total Load 1975-76
Utilities - STP	141.9	184.1	29.74		10.0	10.9
Utilities - WW	176.2	225.7	28.1		12.4	13.4
Industrial Surveys	31.7	59.2	86.7		2.3	3.5
River Monitoring	124.0	120.1	-31		8.7	7.2
River & Lake Surveys	175.0	297.4	69.9		12.4	17.7
Research Support	162.5	132.4	-18.5		11.6	7.9
Non MOE Agencies	33.3	45.1	35.4		2.3	2.7
Misc. Reg. Programs	14.2	32.1	126.1		1.0	1.9
Air Resources Branch	137.5	134.4	- 2.3		9.7	8.0
IJC - PLUARG	30.1	128.7	327.6		2.1	7.6
- Great Lakes	224.6	141.6	-37.0		15.8	8.4
Lake Restoration	73.8	35.3	-52.2		5.2	2.1
Dangerous Emissions	92.7	146.8	58.4		6.5	8.7
ALL PROGRAMS	1,417.5	1,682.9	18.8		100	100

TABLE VI

TORONTO AIR POLLUTION INDEX LEVELS

YEAR	Number of Occasions Exceeding Maximum Desirable Level		First Alert Level	Maximum Level and Date
	32	50		
1970*	17	2	56	Oct. 8
1971	19	1	52	Apr. 13
1972	2	Nil	45	Feb. 13
1973	3	Nil	43	Oct. 24
1974	3	1	50	Oct. 29
1975	2	1	62	Nov. 20

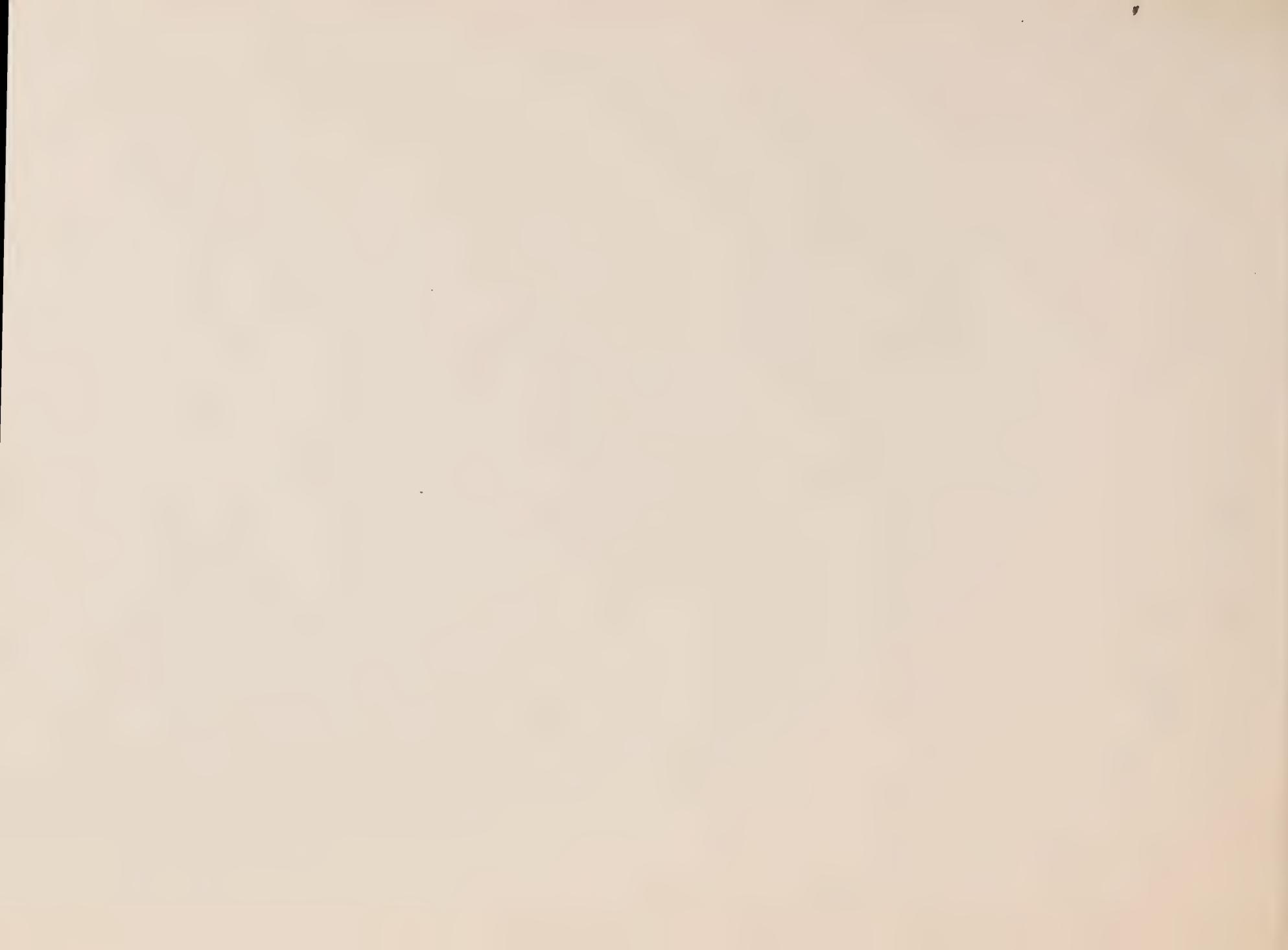
*Started March 23, 1970

TABLE VI
FINANCIAL SERVICES BRANCH

TABLE OF GRANTS

UNDER THE POLLUTION ABATEMENT INCENTIVE ACT

Fiscal Year	Appropriation	Claims	Actual Amount
1970/71	statutory	164	\$ 413,881
1971/72	2,000,000	559	1,944,889
1972/73	2,750,000	176	2,307,076
1973/74	3,750,000	249	1,571,963
1974/75	2,750,000	517	2,749,389
1975/76	3,250,000	564	3,242,125
		2299	
TOTAL ESTIMATED GRANTS FOR POLLUTION ABATEMENT			\$12,229,323



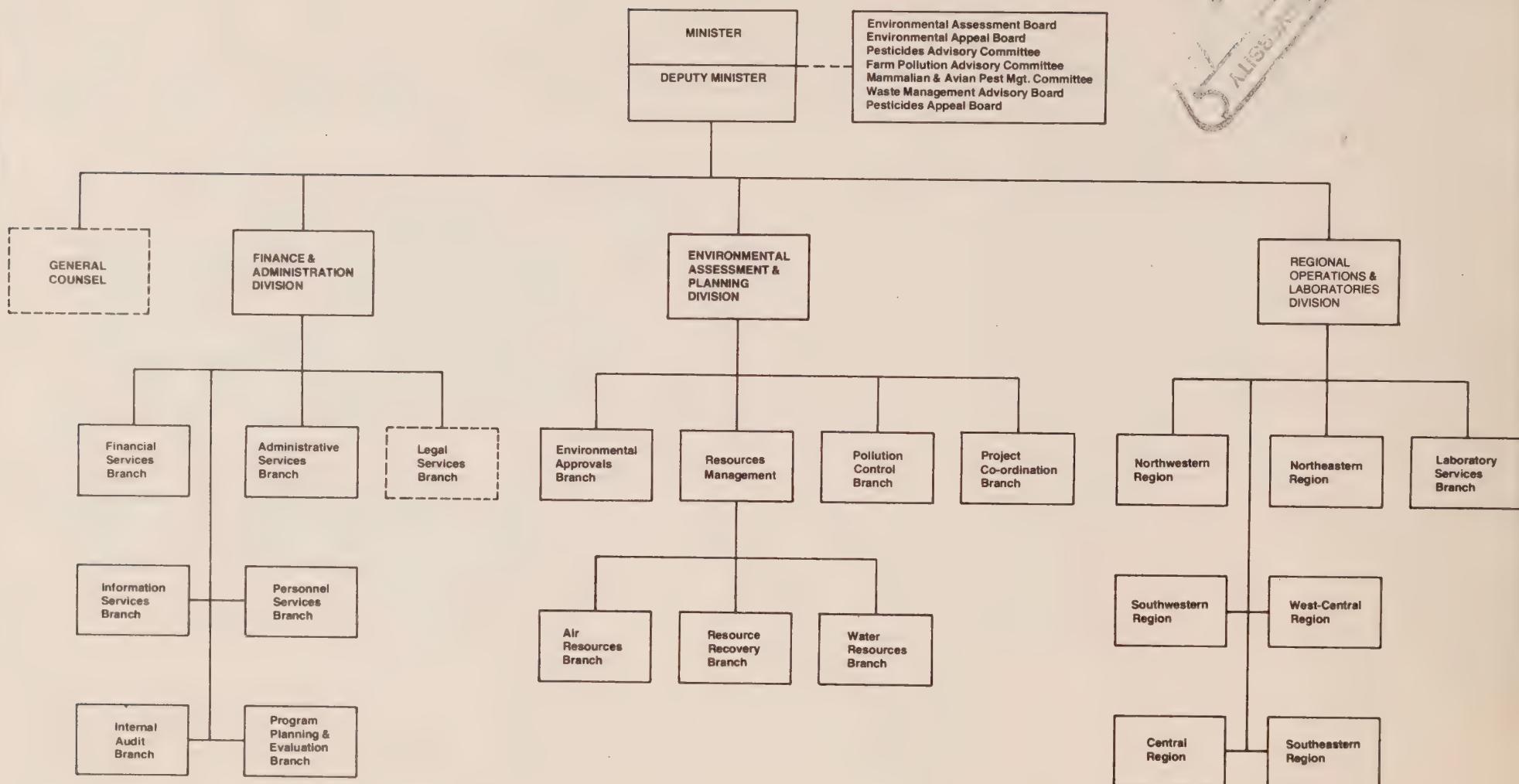
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Ministry of the Environment

Annual Report 1976-77

MINISTRY OF THE ENVIRONMENT



contents

Organization Chart	Frontispiece	
Letter of Transmittal		44
Goals, Objectives, and Achievements 1976-77		45
<u>ENVIRONMENTAL ASSESSMENT AND PLANNING DIVISION</u>		
Air Resources Branch	7	47
Water Resources Branch	8	47
Pollution Control Branch	10	48
Environmental Approvals Branch	14	49
Project Co-ordination Branch	20	50
Resource Recovery Branch	23	50
	24	50
<u>REGIONAL OPERATIONS AND LABORATORIES DIVISION</u>		
Northwestern Region	27	51
Regional Map	28	
Northeastern Region	29	
Southwestern Region	30	
West-Central Region	31	
Central Region	33	
Southeastern Region	35	
Laboratory Services Branch	37	
	39	
<u>FINANCE AND ADMINISTRATION DIVISION</u>		
Administrative Services Branch	41	53
Financial Services Branch	42	53
Legal Services Branch	42	
Personnel Services Branch	43	
	44	
Program Planning and Evaluation Branch		
Internal Audit Branch		45
Information Services Branch		45
<u>BOARDS AND COMMISSIONS</u>		
Waste Management Advisory Board		47
Environmental Assessment Board		48
Pesticides Advisory Committee		49
Environmental Appeal Board		50
Pesticides Appeal Board		50
Farm Pollution Advisory Committee		50
Mammalian and Avian Pest Management Committee		51
<u>APPENDICES</u>		
Graph I - Annual Total Expenditure by Project Type		53
Graph II - Annual Total Expenditure by Class		53
Graph III - Number and Value of Contracts Tendered Annually		54
Graph IV - Annual Volume of Activity		54
Graph V - Sulphur Dioxide in Downtown Toronto		55
Graph VI - Suspended Particulate in Downtown Toronto		55
Graph VII - Projects in Operation		56
Graph VIII - Distribution of Operating Costs - 1976-77		56
Graph IX - Toronto Air Pollution Index Levels		57



To:

The Honourable
George A. Kerr, Q.C., Minister.

Sir,

I have the honour to submit
for your approval the 1976-77
annual report of the
Ministry of the Environment.

Respectfully submitted,

K.H. Sharpe

Kenneth H. Sharpe
Deputy Minister



To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1976, and ending
March 31, 1977.

Respectfully submitted,

Geo. A. Kerr

George A. Kerr, Q.C.
Minister

goals, objectives and achievements 1976-77

OBJECTIVES

In the brief span of 20 years, the field of environmental protection has grown rapidly from the concern of a handful of visionaries to a major responsibility of government agencies around the world.

At the forefront of this tremendous surge in technology and human awareness has been the Government of Ontario which established the Ontario Water Resources Commission in 1957, the first agency of its kind in the world.

The formation of the Department of the Environment followed in 1970 and the two agencies were amalgamated into the Ministry of the Environment in 1972.

Ontario's pioneering commitment to environmental protection has led to research, legislation, and policies which have made the Province a recognized leader in the environmental field.

To continue this record of achievement by providing the eight million citizens of Ontario with the highest level of environmental management, the Ministry has set four major long-term objectives:

- to control contaminant emission;
- to establish environmental safeguards to protect human health and the natural environment;
- to manage Ontario's water resources and to manage waste;
- to develop and maintain measures to restore and enhance the natural environment.

The Ontario Ministry of the Environment has enjoyed a tradition of service in the field of water management and water pollution control. The Ministry itself operates 197 sewage treatment plants and 106 water treatment plants and works closely with municipalities to help them develop and maintain their sewage and water treatment facilities.

This continuing commitment to provide clean water to every citizen of Ontario has been coupled over the years with increasing concern for other challenges including air and noise pollution and a host of newly-discovered exotic contaminants.

achievements

The fiscal year 1976-77 was an active, productive year for the Ontario Ministry of the Environment as it advanced the campaign for a cleaner and safer environment on many fronts.

This significant progress was the result of the co-ordinated effort of the various divisions and operating branches of this Ministry which is documented in this Annual Report.

Major activities and achievements include:

- the initiation of a comprehensive program to provide Ontario residents with the most up-to-date information on any fish contaminant which may pose a hazard to health;
- the expansion of the Ministry's Hazardous Substances Program with the completion of a handbook on more than 100 potentially hazardous compounds;
- the on-schedule construction of the 70 miles of trunk sewer and of the 160 million-gallon-per-day sewage treatment plant for the York-Durham pro-

ject, for the 1980 opening of the biggest single servicing project ever undertaken by the Ministry;

- the undertaking of a demonstration project in agreement with Canada Cement Lafarge of Woodstock to test the use of refuse-derived fuel from the Ministry's experimental resource recovery plant in Downsview as a partial replacement for coal in cement kilns;
- the prosecution of American Can in Marathon under the federal Fisheries Act, resulting in fines of \$64,000 -- the highest yet recorded for a pollution offence in Canada;
- the completion of the first phase of the Ontario Centre for Resource Recovery in Downsview;
- the joint funding by the Ministries of Environment and Energy and the Hearst Lumbermen's Association of a preliminary study on the potential use of wood wastes to create energy supplies in the Hearst area;
- the approval of funding under the Provincial Lottery Corporation for a Ministry-co-ordinated project involving the rehabilitation of abandoned mining areas in Ontario, and the clean-up of lead-contaminated soils in certain Toronto area residential properties;
- the designation of major projects under The Environmental Assessment Act including the proposed forest products complex in northwestern Ontario by Reed Ltd., a planned hydroelectric project on the Spanish River by the International Nickel Company of Canada.

Environmental Health Information

Environmental protection is increasingly a very sophisticated science. Technical innovations and new discoveries based on research are at the forefront of this complex field.

But the central issue continues to be the human issue -- the interaction between man and his environment.

In an effort to better inform the public of the environmental issues which directly affect them, on January 1, 1977, the Ministry assumed responsibility for the issuance of public health information concerning any potentially hazardous environmental condition.

In 1977, the Ministry issued a series of bulletins informing anglers of levels of various contaminants including mercury, Mirex, and PCBs (polychlorinated biphenyls) found in fish sampled from more than 167 Ontario lakes and rivers and the appropriate levels of caution which should be exercised in their consumption.

New Initiatives in Waste Management

Since the Ministry assumed regulatory authority for waste management in 1970, it has sought to reduce waste and to develop programs for resource recovery and recycling of waste.

To encourage long-range large-scale planning for solid waste management, the Ministry has provided 50 per cent subsidies for municipalities to carry out county-wide waste management studies. It has also established advisory bodies on littering and solid waste management and undertaken pilot projects on source separation in homes and offices to help develop new methods by which to reduce the waste of our "throwaway society".

The key element in Environment Ontario's Waste Management Program is the Ontario Centre for Resource Recovery in Downsview, a research and development facility equipped to investigate and create new technologies for both material and energy recovery. It also functions as a reclamation plant, producing material and fuels through resource recovery, and developing markets for these recovered materials.

This year saw the completion of the first phase of that project, a direct transfer facility, now in operation.

Processed combustible waste from the resource recovery centre will be used as cement kiln fuel in a demonstration project with Canada Cement Lafarge in Woodstock, and replace coal in a generator at the Lakeview Hydro Electric Station.

Exotic Contaminants

The increasing capability to detect very low levels of contamination coupled with the growing complexity of industrial processes are opening new areas of environmental concern.

Over the years, Ontario has been a leader in developing the capability to detect, analyze, and control contamination in its more subtle forms, backed by North America's most sophisticated and versatile environmental laboratories.

In 1976-77, more than 16 million tests involving water, air, soil, vegetation, and sediments were performed at the Ministry's regional laboratories and at the main laboratory complex in Toronto.

To establish effective priorities for monitoring and abating the most significant hazards among these exotic contaminants, the Hazardous Substances Program begun in 1975-76, was significantly expanded this year and included the production of a comprehensive handbook of over 100 potentially dangerous compounds or families of compounds.

Expansion of Services

The traditional role of the Ontario Ministry of the Environment has been to maintain and improve water quality

in Ontario and to provide for the expansion of basic services in support of the Province's growth.

The Ministry itself operates 197 sewage treatment plants and 106 water treatment plants and works closely with municipal governments in the development of their own treatment facilities.

To this end, in 1976-77, the Ministry paid out more than \$145 million in capital expenditures, of which over 40 per cent will not be recovered from municipalities and represents a provincial subsidy.

In addition, the Ministry continued major sewage and water projects in key locations, including the York-Durham project, north of Toronto, the largest single servicing project ever undertaken by Environment Ontario.

Pollution Control

Air

Ontario's system of air pollution monitoring and abatement, one of the most advanced in the world, has resulted in Ontario industry spending or committing more than \$1.5 billion for air pollution control. Indications of substantial improvement in air quality in Ontario's key industrial centres have been well documented in recent years.

Water

In Ontario, every major industry is involved in a pollution abatement program with Ministry staff carrying out intensive sampling programs to ensure that our water quality standards are maintained and that abatement schedules are met.

In 1977, in particular, progress was achieved in controlling the discharges from pulp and paper operations,

a major environmental concern in Ontario, with the issuance of more than ten control orders for mills in Ontario.

In appreciation

Everett M. Biggs retired in March 1977 after a total of 29 years of public service with the Ontario government, including five years as deputy minister of the Environment and ten years as deputy minister of Agriculture and Food.

He was appointed deputy minister of the Ontario Department of the Environment on February 9, 1972, and served under three Environment Ministers -- James Auld, William Newman, and George A. Kerr.

When the Department of the Environment and the Ontario Water Resources Commission were combined to form the Ministry of the Environment in 1973, Mr. Biggs coordinated the amalgamation and undertook a major re-organization and decentralization of environmental protection activities.

During his tenure, major programs were mounted in the areas of solid waste management, contaminant detection and measurement, enforcement of abatement measures for existing industries, and provision of improved water and sewage treatment facilities for municipalities.

environmental assessment and planning division

Assistant Deputy Minister: K.H. Sharpe
Executive Director: W.B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

- to serve as a central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation;
- to conduct scientific and technical research, assessment, and planning programs involving the use of water, land, and air resources, the environmental implications of realty development and the control of all forms of pollutants;
- and to provide technical and supervisory services required in the planning, construction, and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

J. Walter Giles was appointed assistant deputy minister responsible for this Division on June 1, 1977.

air resources branch

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology, and recommendations concerning air quality criteria and standards.

Air Quality & Meteorology Section

The Air Quality and Meteorology Section maintains a monitoring network consisting of more than 1,100 air quality and meteorological instruments located in 90 distinct areas of the Province. During 1976-77, 2.3 million data points were computer-processed and assessed. Air quality trend-analysis for the period 1971-76 shows a marked improvement in sulphur dioxide, suspended particulate, and carbon monoxide levels. The Air Pollution Index in the Ontario Alert System was recorded and publicized daily for Windsor, Hamilton, Toronto, Sudbury, Welland, Niagara Falls, New Sudbury, and Coniston.

Ontario's Air Quality Model, previously validated for the Sarnia-St. Clair River area, was used to help develop a control strategy for sulphur dioxide emissions in that part of the Province.

Air quality impact studies of the Toronto Island Airport as related to future aviation and non-aviation uses, were completed in response to requests from Transport Canada and the City of Toronto Planning Board. The results were published in the Toronto Island Airport Study.

Ontario's Air Quality Model was used to evaluate the transboundary flow of suspended particulates across the Niagara River between New York State and Ontario. Trans-boundary studies were also completed on the impact of a coal-fired generating station in Windsor and the impacts of power plants on both sides of the St. Clair area on the Sarnia airshed.

The air pollution emission inventory system was updated and expanded to cover most areas of Ontario. The system was used to provide emission data for Environment Canada's country-wide emission inventory and for the United States Environmental Protection Agency.

Technology Development & Appraisal Section

Technology Development & Appraisal staff designed what is considered to be one of the most advanced air monitoring vans in the world today. Fully computerized, the van was used for preliminary monitoring of the trans-boundary flow of pollutants in the Nanticoke area. They also completed surveys for: mercury near Cobalt and Cornwall; mercury, sulphur dioxide, hydrogen sulphide, and total suspended particulate in Marathon; polychlorinated biphenyls in the area of the St. Lawrence Cement Plant in Mississauga.

The Section conducted major emission surveys on hazardous pollutants such as polychlorinated biphenyls, polynuclear aromatic hydrocarbons, asbestos, and various hydrocarbon species. New sampling methods have been developed for toluene di-isocyanate, phenols and various other pollutants. Work was also started on development of odour measurement techniques. Staff witnessed about 45 compliance tests performed in Ontario and has been active in planning work directed at defining emissions resulting from industrial use of refuse-derived fuels.

Staff also issued reports on PCBs, asbestos, and

electrostatic precipitators and, at year-end, was preparing reports on incineration, vinyl chloride, and fine particulate control technology. Special emphasis was given to hazardous contaminants, particularly PAH emissions, and the control of odours from restaurants, paint spraying, and baking operations.

The Ministry's Hazardous Substances Program was expanded significantly in 1976. The Ministry-wide Hazardous Substances Committee was formed to oversee this important program. The Ministry of Labour's Environmental Health Studies Services contribute medical advice to the Committee's work. Air Resources compiled a comprehensive handbook on a priority list of over 100 potentially hazardous compounds or families of compounds. Additional detailed background documents were prepared on fluorochlorocarbons ("Freons") and air pollution aspects of nickel and arsenic in Ontario.

The Research Grants Program in 1976 provided air pollution research grants to 22 principal investigators in Ontario academic institutions. Three seminars given by 1975-76 grant holders in Toronto during February drew enthusiastic response from Ministry, university, and federal government personnel from across the Province.

The ongoing Sudbury Environmental Study was conducted with much greater emphasis on air pollution aspects in 1976. Intensive field studies of emissions were carried out in Sudbury during the Fall, in co-operation with local industries, consultants, and Environment Canada staff.

Criteria Development and Program Planning Section

In 1976-77, 15 tentative standards and guidelines were proposed for new air contaminants in Ontario.

Following the recommendation of the Advisory Council on Occupational and Environmental Health, two subcommit-

tees were established to recommend official methods of measurement (both at source and in ambient air) for each tentative standard or guideline proposed for new air contaminants by the Environmental Air Standards Setting Committee.

Criteria Development and Program Planning staff worked with nine federally-organized task forces to produce regulations or guidelines for various industries. The Section also drafted air emission guidelines for the Nanticoke and Sarnia areas and prepared detailed reports for five environmental appraisals.

Vehicle Emissions Section

This Section continued to run routine spot-checks of automotive exhaust emissions and to enforce restrictions against tampering with pollution control devices. Approximately 11,000 cars were examined. In addition, 1,150 cars were checked at 130 used car dealerships to ensure replacement of pollution control devices on vehicles being offered for sale.

Automotive inspectors undertook regular highway patrols with the Ontario Provincial Police to make visual checks of truck exhaust emissions. In 1976-77, this program resulted in 573 charges and 418 convictions under The Highway Traffic Act.

Inspectors made 19 visits to eight community colleges to give demonstrations and lectures on the maintenance and operation of automotive control devices. Inspectors also made six visits to Metro Toronto secondary schools and numerous visits to trucking companies with continual records of violation to recommend improved repair and maintenance techniques for avoiding violations.

water resources branch

The Water Resources Branch collects and interprets information on water resources and provides water management, engineering, and scientific services to municipalities, consultants, conservation authorities, and other ministries. As a co-ordinator of information and advice on trace contaminants in water and fish, the Branch has strengthened the Ministry's role with regard to protecting and improving water resources for multiple uses.

Great Lakes

The nearshore waters of Lake Ontario from Niagara-on-the-Lake to Cobourg were studied intensively in 1976. Water quality was found to improve quickly with increased distance from shore and increased water depth; impairment was not generally detected in waters deeper than 30 meters.

An intensive water quality and sediment investigation was carried out in Toronto Harbour in response to needs identified by the Central Waterfront Planning Committee in January 1976. Studies will continue over the next three years in order to provide a basis for judging the environmental impact of various development proposals being put forward for the Toronto waterfront area. A set of proposed water quality criteria was compiled and distributed to various regulatory and planning agencies involved with the Toronto waterfront to serve as a basis for the development of water quality objectives.

Water quality surveys concerning the effects of artificial mixing by aeration were continued in Hamilton Harbour during 1976. Dissolved oxygen increased in the

deeper harbour waters and remained normal in the surface waters.

Investigations continued in several areas of Lake Erie. At Leamington, improvements in water quality were observed following upgrading of sewage treatment facilities serving the municipality and a food processing plant. The impact of the Grand River on the water quality of eastern Lake Erie was under surveillance in the second year of a three-year study of nutrient enrichment. Mercury levels in sediments of the St. Clair River and Lake St. Clair showed a continuation of a declining trend parallel to improving levels in fish. The commercial walleye fishery in western Lake Erie, which had been closed since 1970, was reopened in 1976 following the satisfactory improvement in mercury levels in this fish species.

A report was published documenting water quality improvements in the Detroit River, a result of better sewage collection and treatment facilities having been installed in the Windsor area since 1970. Since 1969, water movement and quality in the coastal region of Lake Erie at Nanticoke have been surveyed.

Water quality surveys in Lake Huron included the Maitland River mouth near Goderich, the Bruce Nuclear Power Development site, Collingwood Harbour, and Penetanguishene and Midland Bays. Summary data evaluations have been prepared for inclusion in the 1976 report to the International Joint Commission.

The application of remote sensing technology to sediment plumes associated with major tributary streams was also investigated this year. Radioactivity data for the Serpent River and the Bruce Generating Station site were summarized and submitted to the Radioactivity Subcommittee of the IJC. Phosphorus tributary loading data for the Canadian side of the Great Lakes were prepared and

submitted for the 1976 Great Lakes Water Quality Board report and also as input to the Upper Lakes Reference Group. Several major reports were prepared for publication: a detailed evaluation of nearshore water quality of Lake Huron and Lake Superior for inclusion in the three-volume report on the IJC Upper Lakes Reference Study; an evaluation of thermal infrared remote sensing for effluent plume mapping; an evaluation of water quality in major embayments, harbours, and nearshore areas of Lake Huron; an evaluation of water quality in Serpent Harbour.

Input to the Pollution from Land Use Activities Reference Group (PLUARG) study under the International Joint Commission was continued. Intensive monitoring of the PLUARG network in the Grand and Saugeen pilot watersheds was terminated at the end of 1976-77. A technical report summarizing the extent of pollution contribution, relative significance of sources and practices, and the degree of transmission of pollutants to boundary waters is to be completed in 1978. The final report of the Upper Great Lakes Reference Group was presented to the International Joint Commission following its intensive three-year study of Lakes Superior and Huron.

Phosphorus Reduction Program

Evaluation of the Sewage Effluent Phosphorous Reduction Program produced two significant findings in 1976. The phosphorous concentrations in the nearshore waters of Western Lake Erie have decreased 50 per cent in 1976 from pre-1970 levels, and there has been a corresponding 42 per cent decrease in the amount of algae in the water. Experience at Gravenhurst dramatically demonstrated the value of phosphorous reduction in controlling algae blooms. When the phosphorous reduction procedure was put on-line in June 1976, the water quality in Gravenhurst Bay began to improve, and by late August the water clarity had reached the highest value on record since the study began in 1969.

Kawartha Lakes

Mechanical harvesting of aquatic plants was put to practical application in Buckhorn Lake. Approximately 900 acres of plants were harvested and over 5,000 tons of wet plants were removed. Research continued on finding economic uses for the plant material. A cattle feed was prepared and successfully test-fed to ten steers.

Analyses of data on water quality and trends in the Trent River basin indicated that:

- (1) areas in which one or more of the provincial water quality guidelines and criteria were often exceeded were few in number and limited in spatial extent;
- (2) water quality appears to have improved since 1973 downstream from Peterborough, Lindsay, and Campbellford;
- (3) improvements in municipal sewage treatment and/or industrial waste treatment have been effected at these three locations.

Sudbury Area Lakes

The reclamation of acidic lakes using lime progressed another step froward with the first stocking of fish in the experimental lakes. Some lakes were fertilized to determine whether productivity can be increased and also to see if fertilization can improve the acidic conditions without adding lime.

Acidic conditions were eliminated in a large lake in a two-step liming process. Detailed measurements of the acid input to the lakes were started this year.

Lakeshore Capacity Study

The water quality component of the Lakeshore Capacity

Study was expanded on the 15 study lakes. Work proceeded on the construction of chemical budgets for the lake development models and on the measurement of the response of the lakes to nutrient inputs. Collation and analysis of information on the effects of human activities on the lakes was begun, and preliminary results will be available in early 1978.

Trace Contaminants

The Ministry of the Environment became the Province's "spokesman" for trace contaminants such as mercury, polychlorinated biphenyls, DDT, and Mirex in January 1977.

Bulletins or advisories on trace contaminants in fish, previously issued by the Ontario Ministry of Health, are now prepared by this Ministry with the technical assistance of medical and scientific staff in the Ministries of Health, Labour, and Natural Resources. Branch staff co-ordinate trace contaminant information distribution and participate in the planning and, in some cases, the implementation of surveillance programs and special studies.

The Lake Simcoe Mercury Study was implemented during the winter of 1976-77 to identify sources and the magnitude of mercury contamination of fish, water, and sediments in Lake Simcoe. Another special study indicated that Mirex (Dechlorane), imported by two manufacturers on the Grand and Credit Rivers, was not contaminating water, fish, or sediments in the water courses adjacent to these industries.

A special fish-monitoring program involving young-of-the-year minnows (spottail shiner) has proven valuable in determining localized areas with high levels of chlorinated-hydrocarbon contaminants. In one case the work identified a previously undetected PCB discharge source.

Branch staff are members of the Interministerial

Committee on Mercury. In 1976-77, the Committee initiated the preparation of a comprehensive publication to guide anglers on safe consumption levels for various species of fish from lakes throughout Ontario.

Grand River Basin Water Management Study

Extensive water resource survey activities continued in the Grand River basin during 1976-77. A wastewater assimilation study was carried out downstream of the Brantford sewage treatment works to provide updated waste loading guidelines for this plant. A survey of the Grand River reach from Paris to Brantford was also conducted to assess current water quality conditions and to provide a technical basis for evaluating possible future expansion of the Paris sewage treatment plant.

Robot monitoring stations continually measured and recorded water quality information at six sites throughout the central portion of the basin. Biological fieldwork was carried out in the headwater reaches of the river as part of the ongoing study of the relationships between nutrient input, biomass production, and diurnal dissolved oxygen fluctuations. The hydrologic studies continued with the evaluation and implementation of computer models for streamflow generation and reservoir operation.

Water Resources Inventories

A report on the groundwater resources in the Duffin Creek-Rouge River drainage basins was completed. A number of major aquifers in the basins offer good potential for groundwater development. The fieldwork and preliminary assessment of surface and groundwater resources in the South Nation River drainage basin was completed during the year and significant progress was made in collating and analyzing water resources data for Northern Ontario.

Groundwater probability maps were completed for Brant

County. Two new groundwater map series were initiated during the year: one to show flowing well areas; the other to indicate major aquifers in the Province. Two aquifers were defined during the year: the Alliston aquifer complex and the Oak Ridges aquifer complex. Fifty flowing well map sheets were published.

"Water Well Records for Ontario, Bulletins 2-14, 2-16, and 2-17", were released showing groundwater and geologic data covering the Regional Municipality of Ottawa-Carleton and the Counties of Leeds, Grenville, Hastings, Prince Edward, and Lennox and Addington. Three publications providing basic information on the Province's streamflows and inland water quality were released: "Selected Streamflow Data for Southern Ontario, 1975" and "1972, Volume VII", and "1973, Volume VIII" of "Water Quality Data for Ontario Lakes and Streams".

Water Management

An extensive project was initiated to review and revise the publication "Guidelines and Criteria for Water Quality Management in Ontario". Work groups will cover surface water quantity, groundwater quality and quantity, and water management implementation procedures more fully; they will also consider the implications of the Canada-Ontario Accord on Environmental Quality and the proposed revisions to the IJC Water Quality Objectives for the Great Lakes. Completion is due March 1978.

The "Permit to Take Water" program, administered under Section 37 of The Ontario Water Resources Act, is undergoing a major review to provide a better and more efficient service to the public. A computer data storage and retrieval system for Permit Applications was completed as part of this review, and a pilot study will test the system prior to its implementation.

Surveillance of the well-drilling industry continued

with the issuing of 489 drilling and boring contractors' licenses. Three successful prosecutions were undertaken against three drilling firms for infractions under Section 40 of The Ontario Water Resources Act. Several training seminars were arranged and presented to regional staff as part of a continuing upgrading program for drilling industry surveillance. Draft changes to Section 40 and Regulation 648/70 were prepared and provided to the Legal Services Branch. Staff described Ontario legislation and regulations at a meeting with the Ontario Water Well Association and at a workshop on "Groundwater Legislation and Regulation" attended by representatives of provincial jurisdictions from across Canada. Technical advice was given to the Province of Nova Scotia which plans to pattern its geologic data system after the Water Well Record System used in Ontario.

Engineering and Scientific Services

Work toward reducing incidents of groundwater contamination in Ontario continued with the carrying out of field examinations and the preparation of position papers. A paper outlining hydrogeologic considerations in landfill site evaluation was completed, and discussion and input were provided on regulation of solid and liquid waste disposal by landfilling. Staff consulted on major sanitary landfill sites throughout the Province.

The soils laboratory continued to conduct a variety of analyses on soil samples, the majority being analyses of the physical properties of sediments submitted under the PLUARG program.

Geophysical surveys using seismic and electrical resistivity methods were carried out in several areas in support of Ministry groundwater development projects. Groundwater contamination also was investigated using electrical resistivity techniques.

The Sample Information System (SIS), an integrated

data storage and retrieval system for ground and surface water quality, was activated.

In a Province-wide industrial wastes survey, wastes were collected from 70 chemical, refinery, textile, steel, pulp and paper, mining, metal finishing, and food processing plants and tested in either the central Rexdale laboratory or one of the two field stations at Lake Panache (Sudbury) and Glenora (Picton). A standardized fish toxicity test for regulatory and monitoring purposes was established during the survey. As a result, the Environmental Protection Service of Environment Canada requested that the Branch complete bioassay tests on industries as a regular monitoring program. This program is proceeding with federal support.

A literature review and field studies were undertaken to document the extent and significance of residual chlorine levels in streams.

River quality models were operated in support of regional programs to set effluent waste-loading guidelines. At a workshop for Ministry staff, members from regional offices, and the Water Resources Branch reviewed water quality management policy and methods for assessing and controlling the quality of rivers and streams.

Branch members provided assistance to regional offices and project staff concerning lake and river currents and waste treatment plant outfalls on the Ottawa River at Rockland, the St. Lawrence River at Gananoque, the Great Lakes at Haldimand-Norfolk and York-Durham, and the Wabigoon River at Dryden.

Staff participated in the activities of the Urban Drainage Subcommittee under the Canada-Ontario Agreement with regard to managing external contracts, collecting data for verification and testing of storm water management models, and evaluating the magnitude and significance

of urban runoff loadings to the Great Lakes. In co-operation with the Ministry of Government Services, two models were placed in operation at the Downsview Computing Centre for use by municipalities and consulting engineering firms designing storm water systems. A manual was prepared and distributed at a workshop for consultants and government staff outlining principles and guidelines for urban storm water management.

pollution control branch

POLICY AND PROGRAM DEVELOPMENT GROUP

Municipal and Private Section

All units of the Municipal and Private Section continued to participate in the activities of the IJC Pollution from Land Use Activities Reference Group (PLUARG) by serving on task forces.

The Solid Waste Unit co-ordinated the Derelict Motor Vehicle Clean-up Program in 15 new municipalities in addition to the 17 carry-over contracts from 1975-76. These projects were mostly located in the northern regions of Ontario. Revenue from the sale of vehicle hulks remained with the municipalities to further their clean-up efforts. During the year, 19,050 hulks were located. Of these, 15,365 were released by the owners, and 13,255 delivered to certified derelict motor vehicle sites. These are returned to steel mills through scrap metal dealers.

In August 1976, a Regulation for soft drink containers was announced. Regulation 687/76 ensured Province-

wide availability of carbonated soft drinks in refillable containers according to brand, size, and flavor, and established a mandatory deposit and cash refund on all refillable soft drink containers. Regulation 687 was amended in March 1977 by Regulation 146/77 which removed the brand matching provision and bans non-refillable bottles as of April 1, 1978. Regulation 114/77, filed in March 1977, deferred the ban on the pull-tab opener on cans until July 1, 1977. A survey, co-ordinated by the Pollution Control Branch and undertaken by the regions, was conducted in November 1976 to determine the degree of compliance and attitudes of retailers to beverage container legislation.

The Private Sewage Unit prepared several amendments to the sewage system regulation, the most significant of which, now effective, sets standards for septic tank construction and private sewage system operation and maintenance.

The Advisory Committee on Private Sewage Disposal Systems was established to advise the Ministry on private sewage matters. The Committee held eight meetings and resolved many outstanding problems associated with the installation and operation of some 750,000 systems in Ontario. The Committee's original mandate expired April 1, 1977, but was extended for another two-year period.

The Water Unit completed draft policies and guidelines on the relative locations of sewer and watermains as well as a draft policy and guidelines on cross-connection control. A draft revision of Chlorination Bulletin 65-W-4 was partially completed; no major changes were anticipated.

The Water Unit participated with Ministry of Health personnel in attempting to document the number and type of treatment devices as well as the legislation and/or regulations pertaining to private home water treatment.

The working group was formed to prepare test procedures for various types of treatment devices out of concern that devices being sold to the public could present health hazards in certain circumstances.

The Water Unit also participated as Ontario's representative on the Federal-Provincial Working Group on Canadian Drinking Water Objectives. The revised draft of the Canadian Drinking Water Standards is to be completed by March 1978.

The Municipal Sewage Unit completed revisions to "Policy and Guidelines to Govern the Use of Plastic Pipe for Buried, Gravity Flow Sewers". A complete listing of water and sewage works in Ontario for 1976 was published. Other policies, "Urban Drainage Management", "Sewers and Watermains Construction Practices", and "Disinfection of Wastewater" were under preparation.

Under the Infrastructure Agreement between Central Mortgage and Housing Corporation and the Ministry of the Environment, a five-year (1976-80) capital budget forecast for all Ontario's water and sewage facilities was produced. Based on the forecast, CMHC financing for sewage and water works construction in Ontario for 1976 was negotiated to be \$110.4 million in loans, \$9 million in grants and \$6.3 million in high-cost construction grants.

Under the International Joint Commission on Great Lakes Water Quality, the Municipal Sewage Unit is responsible for identifying and quantifying waste from municipal sources discharging into the Great Lakes from Ontario. All waste loadings, together with planned remedial programs and the abatement status of Ontario municipalities discharging into the Great Lakes are reported yearly through the Water Quality Board Annual Report.

The Unit is also responsible for administering and co-ordinating the Ministry's activities pertaining to research and program implementation of the Canada-Ontario

Agreement (the surveillance program excepted). One of the more significant programs within COA has been phosphorus removal at all significant municipal sources. The Province-wide implementation of this program was completed in 1976-77. Over 180 sewage treatment plants (or 85 per cent of the total hydraulic capacity of all sewage plants in the Province) were undertaking phosphorus removal at year-end.

The Unit concentrated considerable effort on urban drainage management and sewage sludge utilization on agricultural land. A manual of "Urban Drainage Practices" was prepared by an Inter-Governmental Working Committee outlining the ramifications and practices of innovative urban drainage concepts, and providing methodologies for their adoption and implementation. Draft guidelines were developed by an Interministerial Committee represented by the Ministries of Agriculture and Food, Environment, and Health for the utilization of sewage sludge on agricultural land.

The Unit co-ordinates the development and operation of a Management Information System. In conjunction with the Systems Development Section of the Administrative Services Branch, this Unit is finalizing the development and testing of the "Utility Water Pollution Monitoring Program" which can store and accumulate water and sewage treatment plant operating data and produce comprehensive summaries on the performance efficiencies and loadings, costs, and capabilities of all sewage and water treatment facilities.

The Unit, in conjunction with the regions, carried out the Ontario portion of the data collection for the National Inventory of Municipal Waterworks and Wastewater Systems. The National Inventory is co-sponsored by the federal government and the Federation of Associations on the Canadian Environment (FACE).

Industrial Section

The Section continued to develop guidelines and technical reports for pollution control in the industrial sector and provide technical support to the Ministry's regional operations.

Liquid industrial waste disposal remained a high priority problem. Regulation 926/76 (Transfers of Liquid Industrial Waste) was filed on November 8, 1976, to be effective April 1, 1977. This Regulation formalizes the voluntary waybill system initiated early in 1976, requiring waste generators and disposal site operators to inform the Ministry independently as to types and quantities of waste being generated and disposed of.

A proposal to establish a cambrian disposal well at Canboro, in the Region of Haldimand and Norfolk was received and processed, and then withdrawn by the company just prior to an environmental hearing due to adverse public reaction in the area. A second proposal to establish a liquid wastewater reclamation plant and a 'secure' landfill site at Nanticoke was being processed at year-end. The Section began co-ordinating a Ministry sampling and testing program at an experimental solidification plant for the treatment of liquid industrial wastes which was established during the year by private industry at the Ottawa Street North landfill site in Hamilton.

A major report on the PCB problem was prepared and an information brief on PCB disposal methods was circulated. Considerable work was done concerning the use of PCB alternatives in the electrical industry and the disposal problems associated with these alternatives.

Used oil recycling and disposal received considerable attention during the year. An interministerial task force recommended that the Ministry investigate the environmental aspects of spraying used oil on gravel roads as a dust suppressant. In collaboration with the Ministry of

Transportation and Communications, a field investigation to determine the efficacy and environmental acceptability of used oil and its alternatives was planned and was to be initiated in the summer of 1977.

Funding was received early in 1977 from the Provincial Lottery Corporation for a project involving the rehabilitation of derelict mining lands across Ontario. The Section is to co-ordinate this project, utilizing university students and graduates to inventory all inactive and abandoned mining operations in the Province, and to make general recommendations for rehabilitation, stabilization, and revegetation.

The Ministries of Environment and Energy and the Hearst Lumbermen's Association jointly funded a preliminary study on the potential utilization of wood wastes in the Hearst area. The study was performed by an external consulting engineering firm; results indicated that an energy complex generating steam and electricity was marginally viable. The second phase of the study, a detailed financial and engineering evaluation, was initiated with completion expected in the fall of 1977.

The Section co-ordinated the finalization and publication of the Agricultural Code of Practice which was developed as a tool for land-use planning by municipalities. The code was a joint venture of the Ministries of Agriculture, Housing, and Environment with input from the Farm Pollution Advisory Committee and faculty members of the University of Guelph.

Pesticides Control Section

The Pesticides Control Section works for the safe use and management of pesticides by licensing exterminators and vendors, issuing permits for use, and educating: (1) the public through various publications, and (2) industrial and commercial groups by means of training courses, fact sheets, and study guides. The Section carries out

its programs under The Pesticides Act, 1973, and Ontario Regulation 618/74.

Mosquito Control Program

Due to the 1975 St. Louis encephalitis outbreak in southwestern Ontario, all municipalities south of a line between Sarnia and Toronto were urged to implement mosquito abatement programs. By mid-June 1977, the Section had trained and licensed more than 200 people as mosquito exterminators within the high-risk area. The Ministry also operated a mosquito identification service to determine where different breeds were located and when larvicides should be applied to the water. Only four human cases of St. Louis encephalitis were confirmed in southwestern Ontario in 1976-77.

Termite Control Program

The Termite Control Program provides public information as well as technical and financial assistance to municipalities and homeowners experiencing problems with this insect. In 1976-77, the Section processed 81 applications for provincial grants. Homeowner awards for the chemical treatment of termites and structural repairs totaled \$24,445.42. The 81 properties given grants were located as follows: East York (48), Kincardine (32), Guelph (1).

The Section conducted termite activity surveys using wooden bait-blocks. Blocks were placed in Toronto (3,000), Kincardine (1,500), Guelph (1,000), Leamington (500), and Dresden (300). Survey results will be known in 1977-78.

Licensing

The Section licenses qualified applicants to apply, store, or sell pesticides and is also involved in the licensing of termite and mosquito exterminators. During

1976-77, the Section gave more than 1,600 examinations and issued approximately 5,500 exterminator, 800 operator, and 400 vendor licenses. It also issued 279 permits for the use of restricted products on land, 434 permits for the application of pesticides to water, and 201 permits for structural extermination.

Research was conducted in selected water sites concerning the efficacy of a number of unregistered aquatic herbicides for a variety of aquatic plants.

Noise Pollution Control Section

The Noise Pollution Control Section received 556 noise complaints in 1976-77. Many complaints were voluntarily abated while others required investigation by field staff before feasible abatement measures could be recommended. One prosecution and two Control Orders initiated under The Environmental Protection Act, were successfully concluded. One Control Order, however, has been appealed in the Courts and at year-end was still before the Environmental Appeal Board.

The Model Municipal Noise Control Bylaw was revised and the second edition was issued in May 1976. Several thousand copies of the bylaw were circulated to municipalities, industry, commercial enterprises, and public bodies. During the year, 30 municipalities contacted the Ministry and started to develop Noise Control Bylaws under provisions of Section 95a of the Act. Six of the municipalities completed draft bylaws and presented them to the Ministry for approval: Hamilton, Etobicoke, Guelph, North Bay, Barrie, and Lakefield.

The second year of the Environmental Acoustic Technology Training Program was completed; more than 100 additional candidates received instruction in noise control techniques during the year. Two new training manuals on "Acoustics Technology in Land Use Planning"

were published, and a new training course for land use planners was successfully introduced.

The Noise Pollution Control Section has completed more than 400 assessments of new subdivision projects with respect to noise under the provisions of The Planning Act. Plans for new subdivisions are assessed in relation to noise impacts from industry, highways, railways, and aircraft.

Work continued with regard to: (1) truck noise control, as part of the Model Municipal Noise Control Bylaw Program, and (2) impulsive noises concerning which a study was under way at year-end related to the drop forging industry.

Contingency Planning Section

The "Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials" and two publications supplementing this manual were revised and updated. The Section assisted in establishing three response teams under the provincial spill plan, and assisted in the development of four municipal spill contingency plans.

Staff of the Section assisted in a two-day spill seminar held in Thunder Bay which was attended by approximately 170 people from the public and private sector from Northern Ontario.

A significant amount of time was spent in dealing with the major oil spill on the St. Lawrence River off Alexandria Bay caused by the grounding of the oil barge NEPCO-140. The incident involved the loss of approximately 256,000 Imperial gallons of bunker oil and it occurred in United States waters which resulted in the invocation of the Joint Canada-United States Contingency Plan. The clean-up took more than four months and cost approximately nine million dollars.

The Section received spill reports on 556 incidents which occurred in Ontario. Of these, 383 involved the loss of oil, 61 involved the loss of non-gaseous hazardous materials, seven involved the loss of gaseous materials, and 105 of other pollutants. The average oil spill involved the loss of 910 gallons, this compares with an average of 1,200 gallons for the previous year. These figures do not include the above mentioned NEPCO-140 incident because it took place in U.S. waters, but do include a 64,000 gallon diesel fuel/gasoline spill from the Imperial St. Clair at Parry Sound.

RESEARCH AND DEVELOPMENT GROUP

The Ministry was allocated \$2.5 million from the Provincial Lottery for health-related environmental projects. The Research Advisory Committee was appointed administrator of the funds; guidelines and procedures for project selection were developed and approved; research needs were identified; and the decision was made to undertake a contract research program. Funding is to begin in 1977-78.

Applied Sciences Section

The Applied Sciences Section carries out engineering investigations of innovative and unusual concepts with a view to providing information upon which regulations, policies, procedures and/or guidelines may be based. The Section completed eight studies in 1976-77 resulting in six reports and two papers. Twelve additional studies were under way at year-end, primarily in the fields of private waste disposal, municipal utility construction in cold climates, and energy conservation.

Wastewater Treatment Section

The Wastewater Treatment Section advances the quality of wastewater treatment in Ontario by maintaining and upgrading the level of expertise in wastewater treatment

technology through developmental research and by providing expert advice and assistance to planning, control, and operational staff of the Ministry, municipalities, and industry. The Section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant for developmental research work and operator training.

In 1976-77, the Section was actively involved in 14 research projects dealing with a wide range of subjects including nitrogen removal, bypass flow assessment, storm water treatment, chlorination alternatives, and innovative process evaluations. Four project reports, eight technical papers, and three technical bulletins were prepared on these projects.

The Section prepared 150 memoranda and reports in its advisory capacity on a wide range of subjects including plant operations, process evaluations, treatability studies, and staff training. Section staff members also participated in the Activated Sludge and Chlorination Workshops of the Ministry and in the preparation of training manuals.

Water Technology Section

The Water Technology Section conducted research with regard to chlorinated organics, asbestos, ozone, iron and manganese removal, distribution systems and micro- and macro-biological water quality.

Work concerning chlorinated organic work included a Province-wide survey of halogenated organics found during water treatment and methods of removal/reduction.

Asbestos sampling was continued in order to monitor levels of this substance across the Province. Work on the effect of aggressive water on asbestos-cement pipe was also initiated and sampling methods and storage procedures

were further developed. Reports on asbestos removal through conventional pilot plant treatment and synthetic asbestos additions and recovery were completed.

Iron and manganese problems continued to be investigated. Specific conditions of difficult-to-treat manganese and iron concentrations were treated with hydrogen peroxide/chlorine additions.

Technical advisory work continued with regard to the commissioning of new plants, plant upgrading, and general plant operational and technical problems.

environmental approvals branch

The Environmental Approvals Branch administers The Environmental Assessment Act, participates in various approvals mechanisms governing municipal and industrial activities, and undertakes the development of special studies.

The Environmental Assessment Act was proclaimed on October 20, 1976. The Act requires proponents of major projects to assess during planning stages the effects of their undertakings upon the environment, both natural and man-altered.

The Act was initially applied to Ontario government projects. At year-end, Branch officials were working with municipal and Conservation Authority representatives to draft regulations and define exemptions for projects in their sectors.

Private sector projects generally are to come under the Act at a later date; in the meantime, the Act is

applicable to private projects only when deemed necessary in the public interest, such as the proposed Reed Paper forest products complex in northwestern Ontario, or when submitted on a voluntary basis, such as a planned hydroelectric project for the Spanish River (requested by the International Nickel Company of Canada).

The Land Use Co-ordination & Special Studies Section

The Land Use Co-ordination and Special Studies Section advises other government agencies at all levels and the private sector on environmental matters related to land use planning. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use as well as on economic matters as they are related to the environment in controlling pollution.

In 1976-77, Section staff played a lead role in organizing an International Joint Commission Workshop on the enforcement of pollution abatement on the Great Lakes. In addition, they completed studies on wastepaper and an analysis of solid waste policy, and made a substantial contribution to the preparation of the Ministry's submissions to the Porter Commission (i.e., the Royal Commission on Electric Power Planning).

The Environmental Assessment Section

The Environmental Assessment Section, in addition to administering The Environmental Assessment Act, helps co-ordinate Ministry position papers for the Porter Commission concerning the environmental implications of such subjects as demand for electrical generation, and nuclear energy. In 1976-77, the Section also co-ordinated preparation of the Municipal Working Group Paper which outlines proposals for applying The Environmental Assess-

ment Act to the municipal sector.

Further concerning The Environmental Assessment Act, the Section developed a file system to allow all sectors easy access to environmental assessment documents and the Public Record provisions of the Act. It also ran explanatory training seminars including one in February 1977 for senior municipal engineers and planners.

Section staff participated in a wide range of other projects. They provided liaison between the Ministry and the Grand River Conservation Authority concerning the proposed \$50 million West Montrose flood control dam; commented on the Haldimand-Norfolk servicing scheme; worked with Ministry of Natural Resources staff in the development of ministerial forest management guidelines; and helped develop a slide show with the Information Services Branch to illustrate The Environmental Assessment Act process.

The Design and Equipment Section

The Design and Equipment Section evaluates and approves all engineering design work submitted by consulting engineers on Ministry-financed water and sewage works projects. The Section also prepares standard specifications for equipment selection, design guidelines for process design and material selection, and co-ordinates the Ministry's Metric Conversion Program.

Within this Section, the Field Services Group provides technical expertise in the electronic, electrical, mechanical, and instrumentation fields to agencies involved in environmental control activity. The Plant Performance Group assesses the performance of existing treatment systems and publishes an annual report.

In 1976-77, the Design and Equipment Section reviewed and approved water and sewage works projects estimated at approximately \$200 million; prepared additional design

guidelines; evaluated numerous new equipment and pipes for use on Ministry projects; co-ordinated the preparation and distribution of "Metrication Guidelines for Consulting Engineers", prepared the draft "Energy Conservation Guidelines for Sewage Works"; dealt with problem areas such as mechanical and electrical failures of equipment and safety operation of Ministry-operated water and sewage works; and prepared an annual report for Ministry-operated water and sewage treatment systems.

At year-end, the Section was transferred to the Project Co-ordination Branch to facilitate the development of Ministry-assisted water and sewage treatment and distribution projects.

The Industrial Approvals Section

The Industrial Approvals Section processes applications submitted by industry for the approval of treatment and pollution control facilities. The number of applications received and processed during 1976-77 is summarized below:

<u>APPLICATIONS PROCESSED</u>				
<u>APRIL 1, 1976 - March 31, 1977</u>				
	<u>Received</u>	<u>Approved</u>	<u>Cancelled</u>	<u>Denied</u>
Air	763	716	52	1
Water	85	73	8	1
Waste	106	97	6	0
Total	954	886	66	2

Section staff helped plan the Ministry's Industrial Waste Conference. They also attended meetings of the Reactor Safety Advisory Committee of the AECB in Ottawa to review applications for the establishment of nuclear operations in Ontario, and participated on a subcommittee to develop design criteria for land disposal operations for nuclear wastes.

Applications received from the Texaco Canada refinery in the Nanticoke area for air pollution and water pollution control systems were reviewed and certificates of approval issued in 1976-77. A complex \$25 million refinery wastewater treatment system with an effluent discharge to Lake Erie was also approved. Similar applications for air and water treatment facilities submitted by the Steel Company of Canada Limited were under review at year-end.

The St. Lawrence Cement Company applied for, and received approval to burn chlorinated hydrocarbons in a rotary cement kiln. The application was made following an experimental program sponsored by Environment Canada and closely monitored by the Ontario Research Foundation and this Ministry's Air Resources Branch.

The Municipal and Private Approvals Section

The Municipal and Private Approvals Section processes approval applications made by municipal and private services with respect to water supply and distribution, wastewater treatment collection, solid waste management, and the licensing of septic tank installers and waste haulers.

The Section operates under various sections of The Ontario Water Resources Act and The Environmental Protection Act. It provides technical review for financial subsidy applications made under grant programs of Central Mortgage and Housing Corporation, The Pollution Abatement Incentive Act, and the Ministry of the Environment Regional Subsidy Program.

The Branch approved applications for approximately \$5 million worth of water supply and treatment facilities in 1976-77. Included were several new approaches to wastewater treatment such as rotating biological contractor facilities for the City of Guelph and dechlorination facilities for the Town of Milton. Also approved were major expansions of Metropolitan Toronto treatment facilities at Highland Creek and the Humber River.

Amendments to The Ontario Water Resources Act were placed before the Legislature to transfer some of the approval responsibilities under Sections 41 and 42 of the Act to the regional municipalities.

The Section considered and approved several recycling proposals, including the "Watts from Waste" joint project of Metropolitan Toronto and the Ministry of the Environment. At year-end a number of large landfill proposals were being considered, and hearings were to start through the Environmental Assessment Board with respect to two applications for landfilling in the Maple pit area. During the year, the Director's decision concerning the Brock North site in Pickering was appealed by Metropolitan Toronto to the Environmental Appeal Board as a result of new technical information. Since the new proposal met Ministry standards, the approval was granted.

A Ministry committee, on which the Section is represented, was considering amendments at year-end to Part V of The Environmental Protection Act and Regulation 828 under the Act with regard to solid waste programs. It is planned to update the legislation as improved industrial technology becomes available for problem industrial operations.

The licensing of haulers and installers within the septic tank program continued. Approximately 2,000 such licenses had been issued by the end of 1976-77.

project co-ordination branch

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating, and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1976-77, the Branch handled 215 construction contracts and administered a capital expenditure of approximately \$146 million. Of this amount, 42.9 per cent was paid out as subsidies under the Ministry's construction program for municipalities (see Table I).

The Branch undertook a number of water and sewage works projects for municipalities having no communal facilities and extended existing facilities in many other municipalities. It also continued major sewage and water projects in South Peel Region, Niagara Region, and York-Durham Area and undertook major extensions to sewage treatment facilities in Kenora and Haldimand-Norfolk Region to correct environmental problems and to permit the development of new housing.

In Northern Ontario generous provincial government subsidy, combined with CMHC grants for high-cost projects, enabled the Ministry to proceed with the provision of communal sewage and water facilities which will allow for growth and expansion of industry and housing. Additional funding, provided through the Ministry of Treasury, Economics and Intergovernmental Affairs under DREE (federal Department of Regional Economic Expansion) and RPB (Ontario Regional Priority Budget) schemes, enabled water and sewage works to proceed under this Branch's direction in Geraldton, Nakina, and Longlac. A similar program for the City of Timmins is proceeding under the City's administration.

The Ministry continued with other RPB water and sewage works projects costing an estimated \$15.5 million for Red Lake, Ear Falls, and Kenora and to be completed in 1978. A subsidy of \$10 million from DREE was committed in 1976-77 for sewage and water treatment facilities to be completed by the Ministry over a three-year period.

The Management-by-Results (MBR) system continued to be applied to all new projects considered.

MBR project evaluation for 1976-77 was as follows:

	No.	Estimated Cost
New projects accepted	32	\$37,250,000
New projects rejected	22	26,950,000
Total evaluated	54	\$64,200,000

The Branch continued to administer the grants program for the construction of regional or area sewage and water treatment facilities in regional and specially restructured municipalities. These grants amounted to \$11.588 million in 1976-77. Charts I through IV for fiscal years 1971-72 to 1976-77 show:

- (1) number and value of contracts tendered;
- (2) construction activity by numbers of contracts;
- (3) annual total expenditures for sewage projects and for water projects;
- (4) annual total expenditures for provincial projects and for municipal projects.

The Branch's Groundwater Development Section supervised seven test-drilling contracts and five well-construction contracts with a total value of \$579,000. The Branch also undertook 18 groundwater surveys and six special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

The Branch sponsored innovative techniques for the construction of communal facilities in northern areas. Design was commenced on a low-pressure, shallow-buried sewer system for the old Townsite of Temagami. In Keewatin, test sections of sewers and watermains were installed with different types of insulation and at various depths with monitoring facilities to check performance and resistance to frost action. It is hoped that the information obtained will be valuable in designing pipe installations for northern areas.

During 1976-77, the Project Co-ordination Branch continued to administer the concrete sewer-pipe-plant prequalification program. Fifteen concrete sewer-pipe-plants had prequalified status in 1976-77.

With the proclamation of The Environmental Assessment Act, the Branch arranged for the preparation of environmental impact statements and participated in drawing up guidelines for construction contract requirements for environmental protection. These guidelines were issued to the Ministry's consulting engineers. The Branch continued and expanded on procedures begun in 1975 concerning inclusion of environmental controls in its contract specifications, even for those projects which were or could be exempt from the full assessment process.

Since its formation in 1975, the Branch's Claims & Contracts Section has handled 350 claims registered against various Ministry contractors. Of this total, 27 claims with a value of \$315,000 were pursuant to The Mechanics' Lien Act; the remainder, amounting to \$1.94 million, were filed under The Public Works Creditors Payment Act. At year-end 40 claims remained to be resolved by negotiation, arbitration or litigation.

resource recovery branch

The Resource Recovery Branch was established to co-ordinate the Province's Resource Recovery Program which includes the construction and development of the experimental plant for resource recovery in North York.

Resource Conservation

In 1976-77, the Branch gave special emphasis to material recovery and energy conservation studies having particular impact on waste management issues in immediate need of solution. This work included considerable joint activity with the Ministry of Energy.

The Branch assessed the economic viability of the Ajax steam plant and the possibility of utilizing municipal waste as a source of energy.

In co-operation with the Ministries of Energy and Natural Resources, the Town of Hearst, and the Hearst Lumbermen's Association, the Branch was assessing, at year-end, the feasibility of utilizing woodwaste in the Hearst area as an energy source. Also, at year-end, established sewage sludge disposal techniques, such as incineration using fluid bed incinerators or multiple hearth units, were being assessed to determine the most efficient sludge handling process when utilization of land is not feasible.

Source Separation

Projects were devised for determining the most effective approach to residential source separation. They are to be initiated in four municipalities in 1977-78 and

to include an examination of both curbside and depot systems. The Branch also participated in a joint federal-provincial study of government buildings in Metropolitan Toronto to determine the potential for recovering mixed office waste, and a pilot project for desk-top separation of fine office paper.

Technological Development: Experimental Plant and Demonstration Projects

Construction of the full-sized, \$14.5 million, experimental resource recovery plant continued and was 80 per cent complete at year-end. Capable of processing 600 tons of waste daily, the plant started partial operation in March 1977. A contract was signed with a private waste management company to operate the plant for the Ministry.

Agreement was reached with Canada Cement Lafarge to test the use of a light fraction from the experimental plant as a partial replacement for coal in a cement kiln in Woodstock.

Branch staff have participated in an evaluation of the technical and economic viability of the Reed Ltd. proposal for a material and energy recovery plant in Peel Region. After completion of public hearings, the Environmental Assessment Board recommended approval of the site proposed for the "Watts from Waste" processing facility at Disco Road in Etobicoke and detailed designs were authorized.

Central Processing Plants

Waste management planning studies were under way in Windsor, London, the Regions of Niagara, Halton, Peel and Waterloo, Metropolitan Toronto, and the Belleville-Kingston area. A joint provincial-federal study in the Pembroke-Petawawa area was also completed.

The Ministry was negotiating an agreement with the

Region of Halton covering site selection for a resource recovery plant and the location of markets for a refuse-derived fuel.

Market Development

Marketing efforts were directed primarily at three components of the waste stream: paper, ferrous scrap, and the light fraction consisting of primarily paper and plastic film. Numerous trial melts of ferrous scrap were successfully completed at a mini-steel mill and several iron foundries.

Major studies were carried out to determine current market status for wastepaper and compost.

regional operations and laboratories division

Assistant Deputy Minister: J.R. Barr

The Ministry's six regional offices and 23 district offices provide environmental protection services such as abatement programs, complaint investigation, regional environmental assessment activities, and the operation of sewage and water treatment plants throughout the Province. In each of the six regions these programs are carried out by four sections: Industrial Abatement, Municipal and Private Abatement, Technical Support (environmental monitoring and planning), and Utilities Operation.

In February 1976, the Laboratories Services Branch was transferred to the Regional Operations Division. The Branch is responsible for the main laboratory located on Resources Road in Rexdale and the co-ordination of regional laboratories in Kingston, London, and Thunder Bay.

northwestern region

Primary effort in 1976-77 was directed at improving resource-related environmental problems. Abatement Orders were prepared for eight of the ten pulp and paper mills in the Region. Two pulp and paper companies were charged.

Industrial Abatement Section activities resulted in capital expenditures for pollution abatement facilities of \$45 million in the Region: Thunder Bay terminal grain elevators (\$12 million), the forest industry (\$24 million), Ontario Hydro (\$8 million), mining and other industries (\$1 million). Major improvements in Thunder Bay air quality are anticipated due to continuing abatement programs for terminal grain elevators.

The new Great Lakes Paper Company Limited kraft mill in Thunder Bay underwent start-up. This mill is the first in the world designed to use a closed-cycle effluent system.

The Industrial Abatement Section prepared six Control Orders under Section 6 of The Environmental Protection Act and three Requirement and Directions under Section 69 of The Ontario Water Resources Act for major pollution abatement programs at eight of the pulp and paper mills in the Region. Notices of Intent to issue these Control Orders and Requirement and Directions were served on the companies concerned at year-end.

The Municipal and Private Abatement Section continued inspections of water and sewage treatment facilities and solid waste disposal sites. Development of water works projects was carried out in Nakina, Manitouwadge, and Beardmore. Engineering design proceeded for the extension

or improvement of water works systems in Rainy River, Red Lake, Ear Falls, the Kenora area, Geraldton, and Longlac.

Construction of projects was proceeding or about to start in Rainy River, Ear Falls, the Kenoar area, Ignace, and Thunder Bay.

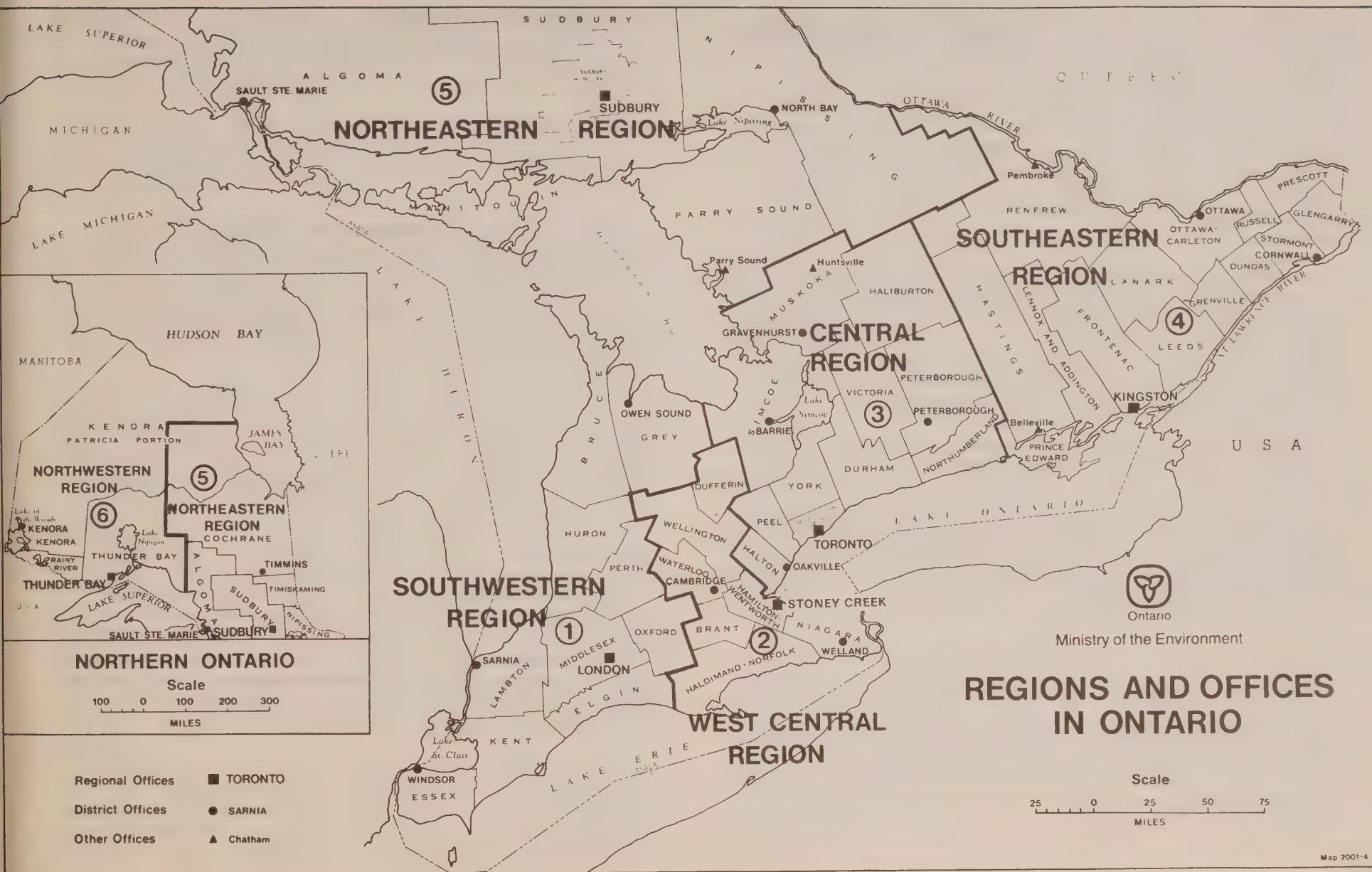
Public response to the Cottage Pollution Control Program carried out in the Region was excellent. A follow-up program was continued at the Lake of the Woods and Rainy Lake. Programs were started on the Shebandowan Lake system and continued along the shoreline of Lake Superior.

Boaters were generally found to be in compliance with regulations governing pollution boats and marinas. The general public responded favourably to "Project Remove", the Derelict Motor Vehicles Program, in Dryden, Fort Frances, Kenora, Rainy River, Red Rock, Geraldton, and Manitouwadge.

Enforcement of The Pesticides Act, 1973, and Regulations emphasized the licensing of land exterminations for herbicide application. Successful legal action was taken against a company for improper utilization of pesticides in structural exterminations.

The Air Quality Assessment Unit continued major monitoring surveys in seven urban centres and issued annual reports for these areas for the year 1975. Special investigations, utilizing vegetation, soil, and snow sampling surveys techniques as well as direct air monitoring, were also conducted near several forest, mining, and grain elevator operations. The regional network of 111 instruments measured particulate pollutants, sulphation rate, sulphur dioxide, hydrogen sulphide, wind direction, and wind speed.

The Water Resources Assessment Unit processed many public enquiries concerning contaminants such as mercury



and PCBs. This Unit operated a 47-station water quality network and conducted regular sampling for the International Joint Commission on streams entering Lake Superior; gathered data used in legal actions against two local pulp and paper companies; completed major investigations for water bodies associated with industrial and recreational activity. In co-operation with the U.S. Environmental Protection Agency, the Unit also created computer files on the STORET system for water quality monitoring sites on Rainy River at the Ontario-Minnesota boundary.

The Approvals and Planning Unit continued its responsibility for co-ordination of regional responses to environmental impact statements and review of municipal subdivisions and other development proposals. Magnetic tape data files were created to improve regional capability to retrieve, analyze, and interpret information collected at water quality monitoring stations.

The Utility Operations Section operated eight water treatment plants and ten sewage treatment plants. Three new projects were commissioned during the latter part of the year, and negotiations were commenced at the end of the year to transfer the operating responsibility of the Thunder Bay W.P.C.P. to the City of Thunder Bay. Construction starts were made on two distribution systems and one water treatment plant.

northeastern region

Activities in the Northeastern Region generally increased in 1976-77, particularly in matters involving environmental assessment.

The Air Quality Assessment Section operated and maintained 220 instruments and recorders. In terms of data validity, an efficiency of over 90 per cent was maintained at most stations.

The Plant Pathology Unit collected over 3,500 vegetation and soil samples for chemical analysis during surveillance studies. Thirty-two complaints of possible air pollutant injury to vegetation were investigated.

Groundwater interference complaints due to generally low water levels in the Region continued to be a major concern to the public. A summary report on the three-year extensive monitoring study of acid lakes in the Sudbury area was drafted. Wastewater assimilation studies were completed on the Lower Junction Creek System and Coniston Creek. Extensive monitoring for radiological variables in water was conducted in the Elliot Lake area. A total of 140 water quality and ten water quantity monitoring stations were maintained in the Region.

The Industrial Abatement Section investigated 555 complaints and 407 contingency spills or upsets due to abnormal operating conditions; reviewed existing sulphur dioxide abatement programs at Sudbury nickel smelters; conducted abatement surveys in the Cobalt area; conducted

major surveys at five pulp and paper mills that resulted in one Control Order being issued; completed surveys of active and inactive mining properties in the Elliot Lake area that resulted in two Notices of Intent being issued.

The Derelict Motor Vehicle Clean-up Program continued to receive enthusiastic response in the Region. Several additional municipalities have entered into a contract with the Ministry.

There was an increase in applications for new provincial water and sewage projects both in the Sudbury district, due to continued development in the area and inadequacies of existing systems, and along Highway 11 as development centres gained status as municipal corporations.

After two years of detailed investigations and many meetings, it was decided to service the old town site of Temagami with a new low-pressure, shallow buried sewerage system.

The Utility Operations Section operated and administered a total of 59 treatment facilities including 19 water works and 40 sewage treatment plants.

Three new sewage treatment facilities were constructed and put into operation in 1976 to serve Hornepayne, Smooth Rock Falls, and Warren. Water and sewer main extensions and pump stations were completed in Hearst, Louisberg, and St. Pie X. Extensive spring flooding in South Porcupine endangered the Ministry's sewage pumping stations but around-the-clock efforts by staff and contractors hired to construct dikes averted a serious problem.

southwestern region

The Industrial Abatement Section shut down the last operating liquid industrial waste disposal well in the Region in accordance with Ministry policy to discontinue disposal into the Detroit River Formation. Staff are carrying out extensive studies to develop alternative long-term solutions.

Studies continued in the Petrolia area toward development of alternatives for the disposal of oil field brines. Oil well operators were instructed to discontinue brine disposal to Buttermilk Creek by the end of May 1977 in order to correct an odour problem in the surrounding residential area.

A Requirement and Direction was issued to Polysar Limited requiring a reduction in dissolved organics being discharged to the St. Clair River. A St. Clair River study has been established to identify additional waste treatment needs for industries located along the river.

The increased use of cannery vegetable wastes as a livestock food supplement has posed serious air and water pollution problems in the Region. This Ministry, in co-operation with the Ministry of Agriculture and Food has prepared guidelines for the information of farmers on the subject. The Farm Pollution Advisory Committee has been involved in some of the complaint situations; it is planned to inspect every farm in the Region making use of these wastes.

During the winter frequent power interruption occurred in the west-Windsor area due to insulator failures attributed by the Windsor Utilities Commission to fall-out of particulate matter originating from industry in Wayne County. Court action was contemplated, and the City requested the assistance of the Ministry of the Environment. The City of Windsor also expressed concern over the City of Detroit's intention to expand the sewage sludge incineration capacity at its sewage treatment facilities. The Ministry was conducting a model study to assess the air quality impact of the proposal and was to frame an appropriate response to Michigan and Wayne County. Both of these issues were being dealt with in accordance with the provisions of the Memorandum of Understanding with respect to air pollution in the boundary area along the St. Clair and Detroit Rivers.

A guideline proposed by the Ministry of the Environment for controlling sulphur dioxide emissions in the Sarnia area was under review by industry at year-end.

Municipal and Private Abatement Section

Staff inspected municipal waste and sewage treatment plants for operating efficiency. As a result, expansions of several works were undertaken, including those in Owen Sound, Woodstock, Chatham, Windsor, and Kincardine. Section staff also spent considerable time meeting with municipal representatives to establish interim development policies to meet conditions imposed by the Thames River Basin Study.

Two proposals for front-end solid waste processing plants were presented during the year to serve Windsor and London. Both municipal councils showed considerable interest in the proposal and asked that a further presentation be made once a market for all or a portion of the wastes had been developed.

Existing landfill sites in the Region are being

properly operated. However, to reduce operating costs, and eliminate all poorly located sites, staff have continued to assist in the establishment of large regional sites in Oxford, Bruce, and Elgin Counties.

Interim servicing policies were developed for areas where fiscal constraints have delayed the construction of works. In place of proposed sewage works, the installation of small, temporary, communal subsurface systems has been allowed.

Utility Operations Section

At year-end, the Utility Operations Section was responsible for the operation of 16 water treatment plants, seven well facilities, 17 mechanical sewage treatment plants, and 40 waste stabilization systems.

Total permanent project operating staff at year-end numbered 145.

A full-time safety officer was hired, and programs on first-aid training, gas and oxygen detection, and confined space entry safety procedures were initiated for project and regional office staff.

Technical Support Section

The Technical Support Section continued an ambitious surface water quality and quantity monitoring program that is to serve as a basis for pollution abatement programs. The Section also prepared reports for the Towns of Essex and Tilbury, and the Catfish Creek Watershed. Also published was the report "Enrichment Status of Owen Sound Bay, Tobermory Harbour, and 13 Lakes in Grey and Bruce Counties, 1975-76".

Section staff investigated 35 groundwater quality complaints related primarily to taste and odour problems caused by contamination from landfill sites, private waste

disposal systems, and from spills in the vicinity of wells. Comprehensive regional reports were prepared for problems at the Owen Sound and Denby landfill sites.

The Section received 80 complaints concerning ground-water quantity interference; most were resolved by year-end. Section staff made 2,215 inspections of new water wells and recommended corrective actions to 1,338 well-owners.

Monitoring of wells previously used for the disposal of liquid industrial wastes and wells used for the disposal of brine continued. Water wells in the vicinity of deep-well disposal operations were also monitored. The testing of 32 private water supplies revealed no contamination attributable to deep well or brine disposal.

Staff from the Michigan Department of Natural Resources, Wayne County Health Department, and this Ministry prepared an extensive report on ambient air quality in the transboundary area of Michigan and Ontario. This Ministry's existing air monitoring network in the transboundary area was improved by the installation of additional sulphur dioxide, suspended particulate, and ozone monitors. Ambient air monitoring of dustfall, suspended particulate, and sulphation rate was initiated in Goderich. A preventative maintenance program was implemented to produce more reliable operation of instruments and a greater percentage of valid data.

Comments on environmental matters were provided to the Ministry of Housing following the review of official plans and amendments prepared by 76 municipalities. In addition, assistance was provided to several planning boards and their consultants during the preparation of planning documents to ensure that environmental considerations were recognized and incorporated into policies within the plan prior to the formal approval process.

Work on the isolation and identification of Salmo-

nella from poultry and meat packing wastes was completed. This parameter is now routinely used to monitor wastes from these sources.

west central region

Water resources management within the West Central Region, emphasised economical provision of an ample supply of good quality water during the next quarter-century. This work required close working ties with municipal officials and officials of the Grand River Conservation Authority.

As a result, several innovative schemes for the treatment of sewage were under study. If applied, they would substantially reduce the costs being incurred by traditional treatment methods. Rapid increases in construction costs for sewage treatment systems over the past few years have placed smaller communities under financial pressure.

New or expanded major sewage treatment systems were under construction at Grimsby, Kitchener, Waterloo, and Simcoe. A water supply system was completed at Courtland and a large system at Nanticoke is being built. The design of the Dundas Sewage Treatment Plant expansion is well advanced. Completion of the improvements is expected to make a marked contribution to the water quality of the wildlife sanctuary of Cootes Paradise.

Despite isolated incidents of gross airborne contamination (e.g., when coal particles from steel works in

Hamilton were deposited in a residential area) there were substantial reductions in emission from industry. However, it is becoming increasingly suspected that the stirring of dust from roads, construction sites, bare soil, and open spaces is contributing more to pollution than airborne particles from industrial sources.

This matter is being recognized on an international scale. From the most heavily polluted parts of Hamilton, it appears that on the basis of annual average, the contribution of airborne particles from industrial sources constitutes rather less than 25 per cent of the total. This does not mean to say that on many days, industry is not a major source of contamination, however, in the larger terms, it is not as significant as background contributed by road dust, demolition, construction, and general city activity. Abatement of industrial sources in Hamilton has diminished emissions of airborne particles by more than 60 per cent since 1970 at an approximate capital cost of \$72 million for abatement equipment. Abatement programs covering the forthcoming period, 1977-85, will cost a further \$80 million but the reduction of emissions of particles will only provide a diminution of a further 12 or 13 per cent.

Malodours associated with industry decreased in frequency though the prospect of their total elimination remains elusive. The progress in controls being applied to carbon manufacture and coke production at steel works in Hamilton appear to be the major causes of improvement.

Control of odours is considered one of the most difficult tasks facing any environmental agency. Reductions of a hundred fold and even a thousand fold in the concentrations of the offensive ingredients often fail to produce an air quality that people find acceptable. Reduction in frequency of the incidence of malodours is rarely accounted as success. Furthermore, the high temperature incineration of odorous gases is becoming less acceptable due to fuel constraints. These factors

mean that odour reductions, especially for such facilities as the three or four sewage treatment plants that have been especially prone to complaints in this last year, must be accomplished by operators' skill in manipulating processes rather than by traditional abatement equipment.

Smells stemming from contaminated waters in Cootes Paradise and the Windermere Basin portions of Hamilton Harbour were most offensive at times. Complaints of malodours from people living near sewage treatment plants occurred as a result of incompatible land usage. These plants were situated at St. Catharines, Waterdown, Cambridge (Preston), and, occasionally, Dundas.

The awareness of the lack of a well-founded industrial liquid waste disposal system has been keenly felt in the West-Central Region which embraces a major portion of the Province's heavy industry. One disposal company in Hamilton that dealt with incinerable liquid wastes has gone out-of-business. The limitations of remaining facilities have meant a reliance on the disposal of wastes in the Upper Ottawa Street landfill site in Hamilton. This is hardly an acceptable situation but it offers some degree of confinement to wastes that would be intolerable if they were disposed of at will over the countryside. However, a process of solidification has been introduced on a pilot basis at the Upper Ottawa Street site. It shows great promise and, indeed, it has been successfully applied to a range of liquid wastes stemming from the steel industry.

During the year, nine Section 83 reports were issued as well as five Control Orders and four Program Approvals. A total of 55 violation notices were served, and six companies were taken to court.

Abatement programs resulted in an expenditure of over \$28 million by industry within the West-Central Region.

central region

Central Region is one of the heaviest industrialized and intensively used recreational areas in the Province.

Significant activities included: the air quality improvement program in the core area along Lake Ontario basin studied in regard to receiving capacity; environmental control activities in recreational areas; the waste management site development program; liquid waste disposal, and regional planning.

Major improvements in Toronto's air quality continued to be achieved during 1976. Sulphur dioxide was unchanged from 1975 at a level well below the annual criterion (see Graph VII). Suspended particulate reached the lowest level ever monitored but was still above the annual criterion (see Graph VIII). The API (Air Pollution Index) also reached an all-time low by exceeding the maximum desirable level on only one occasion. Table II summarizes the number of occasions the API has exceeded the desirable level for Toronto since its inception in March 1970.

Monitoring for hazardous substances was expanded in 1976-77. The intensive lead monitoring program in the vicinity of five Toronto area lead plants was continued. Airborne asbestos was monitored at five plants using asbestos in the Region.

PCBs (polychlorinated biphenyls) were monitored in the ambient air in Mississauga to ensure the safe incin-

eration of contaminated oil during a total burn at St. Lawrence Cement.

High ozone levels continue to be measured in rural areas outside Metro Toronto. These levels are potentially damaging to agricultural crops and can result in reduced yields.

During the year, 337 applications were processed related to environmental emissions. Evaluations involved analysis of equipment for controlling emissions of contaminants such as asbestos, lead, and other heavy metals. In efforts to improve the environment, 56 Violation Notices and three Orders were issued and nine Court Actions initiated. Air abatement programs, estimated to cost \$18 million, were initiated at petroleum refineries, metal processing plants, and other industries.

The Environmental Hearing Board report on "Lead Contamination in the Metropolitan Toronto Area" was analyzed, and a document was prepared containing the implications of the Board's report as well as a recommended course of action for the Ministry. A Committee was established to consider the recommendations in the Board's report under the chairmanship of Mr. P.G. Cockburn. The Committee consisted of approximately 20 members from ratepayers' groups, the City Board of Health, industries, and government. At year-end, arrangements were being finalized for the letting of a contract for soil removal and restoration in residential areas near several lead smelting operations.

The Region completed its studies on the Upper Humber River and reported its findings in a report entitled "Upper Humber River, Permissible Waste Loadings from Additional Urban Development, Based on Water Quality Considerations". The report designated allowable waste loadings for three urban communities -- Bolton, Kleinburg, and Nobleton -- and recommended secondary treatment with

phosphorus removal and effluent filtration of all sewage treatment plants discharging continuously to the Humber River.

As part of the program to protect recreational lakes, surveys were undertaken in Head, Grass, Kashagawigamog, and Kawagama Lakes in the provincial County of Haliburton and Pencil Lake in the County of Peterborough.

Additional lake data were obtained through the Self-Help Lake Quality Program on 71 recreational lakes. Lake data was collected by concerned citizens and analyzed in Ministry laboratories.

During 1976-77, 68 cottage associations participated in self-help water quality monitoring programs designed to maintain a continuing record of the trophic status of their respective lakes.

In conjunction with the waste management studies being completed by the Regional Municipalities of Peel, York, and Durham, the Ministry of the Environment engaged consultants to prepare a master plan to provide an overview for solid waste management in the Metropolitan Toronto-centred area. The report, completed in October 1976, recommended that each regional municipality have responsibility and authority for solid waste disposal in its respective area and that the regional acts should be amended to give the regions the authority to approve of the establishment of all new sites.

With the expenditure of \$15 million during the 1976-77 budget year and a projected expenditure of \$46 million in the coming year, the program of providing water and sewer service for the central York corridor area and for the Pickering-Ajax area of the Region of Durham was well on the way to providing for the servicing needs for the indicated areas.

The disposal of difficult-to-treat liquid industrial

wastes continued to be a very perplexing problem during the year. Control on the operation of the Tricel incineration facility in Mississauga, the closure of the deep wells into the Detroit River formation in the Sarnia area, and the announcement by Metropolitan Toronto Works Department of the staged closure of the Beare Road Landfill Site to liquid wastes, resulted in the liquid waste disposal situation becoming more critical. Concern was expressed by industry and the liquid waste haulers with regard to the limited number of outlets available to industry for the disposal of liquid wastes. Research on the use of certain highly-toxic liquid wastes as fuel in the cement manufacturing process may result in a partial solution to the disposal of materials not normally amenable to landfill operations.

During the year, the Central Region assumed an increasingly active role in provincial level planning and in inter-agency planning liaison with several regional municipalities with special attention being given to the Provincial Task Force for Northumberland. This Task Force, formed to facilitate implementation of the Northumberland development strategy, has been instrumental in accelerating the design and construction of several servicing schemes with funding through the Regional Priority Budget of the Province. Staff planners and Municipal Abatement engineers participated on liaison committees contributing to Official Plans for the Regions of Halton and York and the County of Victoria, and completed liaison with the District Municipality of Muskoka, upon final submission of their plan. As well, staff actively contributed to a number of technical committees evaluating major secondary plans in the Regional Municipality of York and other large development proposals elsewhere in the Region.

southeastern region

Routine work for 1976-77 consisted of almost 4,200 inspections of water, air, and land pollution control facilities operated by municipalities and industries. Major surveys were conducted on 162 facilities to provide additional information for future purposes. In conjunction with the Ministry of Natural Resources, 55 recreational lakes were surveyed while 50 additional lakes were included in the Cottagers' Self-Help Program. Almost 9,000 wells were inspected to ensure that the location, construction techniques, and well-logs submitted were adequate. In order to maintain control over the water resources of the Region, 20 streamflow gauges and nine well recorders were operated. Forty-eight monitoring stations were maintained in addition to 120 stations operated by the Conservation Authorities in conjunction with regional offices.

Recorded were 89 spill incidents including one of three million gallons of oil caused by a barge (the NEPCO-140) running aground in the St. Lawrence River. In addition, 1,740 complaints were responded to, virtually all of which were resolved.

Regional personnel assisted with the 1976 Olympics sailing events at Portsmouth Harbour in Kingston by ensuring that official entries were provided with adequate facilities to meet the Ontario Boating Regulations.

A joint comprehensive survey with Environment Canada was undertaken at the last remaining chlor-alkali plant in

Ontario, i.e. the CIL operation in Cornwall. Survey results indicated that the company was meeting all requirements concerning liquid waste discharges. Small improvements are required to meet proposed federal regulations for air discharges, although ambient air mercury levels off company property met Ontario criteria.

Regional offices received numerous complaints regarding noise, vibration and dust from quarry operations. Staff from the Ministry of Natural Resources co-operated in dealing with these complaints.

Problems were encountered, but subsequently resolved, at Eastern Steelcasting Company (IVCO) near L'Original concerning: (1) the mechanical breakdown of recently installed air pollution control facilities, and (2) public complaints about plant esthetics.

Storm water treatment facilities continued to be provided in the Ottawa area; several projects were under construction at year-end.

Six Enforcement Orders were issued, including one to an industry discharging arsenic-bearing wastes in the Ottawa area. Three additional Orders were being prepared at year-end. One Order was appealed to the Environmental Hearing Board; appeal proceedings remained incomplete at year-end. Successful judgements on four prosecutions were received during the year.

At year-end, regional staff operated 62 water and sewage facilities with a gross capital investment in excess of 100 million dollars. Eight new facilities were opened during the year.

With the co-operation of provincial and municipal agencies, an extensive study of the Mississippi Lake was undertaken to assess its capability for additional recreational use in the future. An extensive study of the causes, effects and consequences of weed growth in Lake

St. Francis was completed.

Only ten charges were laid under the Boating Program Regulation. All offenders were from Quebec or the United States.

A private wastepaper recycling plant was constructed near Belleville after approval by the Environmental Hearing Board. Through funds provided by a SWEEP '76 Program, it was determined that it would be financially advantageous for a steam generating facility utilizing municipal refuse to be constructed to serve the Canadian Armed Forces Base at Kingston.

Radiological problems received a great deal of publicity during the year. An open meeting was held regarding the re-opening of the Madawaska Mines near Bancroft. Much publicity was generated when the federal government (AECL) undertook investigations regarding the possibility of locating a nuclear waste storage facility near Madoc.

Co-operation was provided to Environment Canada in the maintenance of fluoride instrumentation on an Indian reserve south of Cornwall. The source of the problem is in the United States near Massena. Fluoride emissions have decreased over the years, and only minor complaints were received in 1976-77.

The Regional laboratory in Kingston proved to be an immense success in terms of assistance to field operations.

The many interfaces between rural, urban, and recreational land use in the Region continued to be a problem throughout the year. Staff participation in the planning process may help to resolve some of these problems. Complaints regarding cattle watering, odours, etc., were reported.

Many municipalities did not enforce sewer-use bylaws. As a result, frequent plant upsets occurred, requiring plant staff to don protective clothing and breathing apparatus. An extensive safety program was introduced during the year to protect the health and safety of field and plant staff in the performance of their duties.

laboratory services branch

In 1976-77, Laboratory Services Branch underwent considerable internal re-organization to meet the need to monitor an increasing number of newly emerging pollutants, and a shift in emphasis to detecting trace organic pollutants in water, land, and air. Numerous research projects were undertaken to improve the quality of data and the understanding of data in terms of how they relate contaminant levels to environmental or health effects.

Overall, the Branch continued to provide analytical support to the Ministry's environmental quality assessment and pollution abatement programs. Its central and regional laboratories performed 1,650,000 tests, a total within two per cent of the previous year's and, as such, an indication of stabilization in most Ministry programs. Table III summarizes the workload for each laboratory group and provides a comparison with 1975-76.

Environmental Assessment Testing

In addition to the routine testing of water, wastewater, air, soil, vegetation, and sediments, the Branch was involved in several special programs. The Pollution from Land Use Activities Reference Group (PLUARG) required over 125,000 tests and received specialized assistance in terms of data quality control and custom testing to

elucidate the role of suspended sediments in pollutant transport.

The Sudbury Environmental Study (SES) required about 50,000 tests, including regular chemical and microbiological testing of air and treated/untreated lakes, and specialty stack testing. A field laboratory and a metals laboratory were set up at Laurentian University to handle on-site analysis of perishable parameters and provide faster service. Extensive development programs were undertaken for free and total metals testing in waters and for measuring acid sulphates in air.

The Branch undertook major analytical programs for highly-toxic pollutants such as mercury, PCB, and asbestos. The number of mercury analyses performed totaled over 21,000. The Branch provided major analytical support for fish surveys on the Wabigoon-English system and Lake St. Clair and in the Parry Sound, Timmins, Kapuskasing, Gogama, and Muskoka regions; co-operated in major surveys of water, sediment, and fish testing on Lake Simcoe and in the Muskokas following the discovery of elevated mercury levels in fish from these areas; and participated in major sediment and water programs for mercury analysis at Cornwall (the CIL plant), Dryden, Peninsula Harbour, on the St. Lawrence River, and in Lake St. Clair.

The Branch conducted over 50,000 PCB, Mirex, and other organochlorine tests on water, sediment, and fish samples. Automation of methods and expansion of laboratory facilities enabled the newly formed Pesticide Section to greatly increase productivity. Mirex analysis was integrated into the routine pesticide scan on all types of pesticide samples. PCB analysis was performed during major fish sampling surveys and in investigating PCB spills at four northern Ontario locations. Extensive specialty testing led to development of a polymer cartridge for sampling and analysis of PCBs in the air.

Method Development & Quality Control

The Ministry funded an Expert Committee on Asbestos Methodology, under the chairmanship of laboratory staff, to develop a proven and acceptable method for the asbestos analysis of drinking and surface waters.

New methods were developed to allow the routine analysis of: Mirex in fish, water, and sediments; beryllium, thallium, and antimony in water and wastewater; polynuclear aromatic hydrocarbons (PAH's) in fish tissue, and air particulates; toluene-diisocyanate in stack gases; and hyamine in water. As part of the St. Clair River study, analytical methods were also developed for 35 organic compounds identified in samples from this area, and for the identification of volatile organic substances present in tainted fish tissue. A method for determining Nitrogen Oxygen Demand was developed for waters and wastewaters. A variety of new toxonomic techniques were brought on-stream to identify specific bacteria in environmental samples.

Methods were refined, in terms of sensitivity and accuracy, for many parameters. PCB sensitivity was extended to one part per trillion, as was methyl mercury in water. New equipment permitted analytical advances such as the use of attenuated infrared total reflectance for the identification of trace organics which form a monomolecular "sheen" on water surfaces. The addition of a 20,000 high resolution kit to the Mass Spectrometer System provided a means of characterizing PCB isomers which could not be resolved by gas chromatography. The Mass Spectrometer Program included 600 GC/MS runs and resulted in positive identifications of over 1,000 organic compounds. An inductively coupled plasma torch was added to the emission spectrograph, providing a stable power source for the analysis of metals in liquids with greatly increased sensitivity. The Emission Spectrograph Laboratory performed 30,000 tests related to water and sediment programs, and to calibration of the equipment.

To improve quality control of analytical data, Branch sections participated in numerous round-robin experiments with outside agencies. Over 200 comparison samples (representing waters, sediments, fish, vegetation, and sewage sludge) were distributed to, or received from, more than 50 other laboratories; data was compared for organochlorines, PCBs, mercury, heavy metals (lead, cadmium, arsenic, etc.), asbestos, nutrients, and other compounds. As well, thousands of replicate determinations, spike recovery checks, standard reference materials, and calibration controls were routinely analyzed in the Branch's ongoing attempt to supply reliable data.

Other Studies

Several train derailments involving ore cars and chemicals required rapid analysis of PCBs, metals, and other parameters to facilitate corrective action. The analysis of haloforms in drinking water was a major activity during 1976-77. Special field-laboratory studies were carried out to: measure residual combined chlorine in receiving waters; study asphalt products to determine their potential as PAH sources; analyze "available" versus total metals in sediments; study the relationship between oxygen and lake depth; examine the efficacy of waste cementation by leaching the cement product formed; establish the relationship between heavy metals, nutrients, and particle size in sediments; investigate the acid generation potential and metals mobilization from abandoned mine tailings areas.

Branch staff presented 20 papers at scientific symposia; had eight papers published in technical journals, and 21 papers published as Ministry reports; and prepared more than 70 in-house reports. Branch staff also participated in several conferences and represented the Ministry on numerous working committees. The laboratory was visited by scientists from various provincial and state environmental agencies, as well as from numerous industrial, university, and commercial laboratories.

LABORATORY SERVICES BRANCH

TESTS PERFORMED, 1975/76 COMPARED TO 1976/77

TESTS X 1000

LAB UNIT	1975/76	1976/77	% CHANGE
London	209	182	- 12.9%
Thunder Bay	91	92	+ 1.1%
Kingston	73	104	+ 42.5%
Water Quality Section	816	774	- 5.1%
Inorganic Trace Contaminant	142	139	- 2.1%
Organic Trace Contaminant	50	106	*+112%
Air Quality Section	122	116	- 4.9%
Microbiology	179	137	- 23.5%
Laboratory Total	1,682	1,650	- 1.9%

* Includes Pesticides Section

finance and administration division

Executive Director: G.E. Higham

This Division provides a complete range of support services to the operating divisions required for the efficient operation of the Ministry. As the Ministry's central agency it has extensive responsibilities in three general areas: service, control, and co-ordination.

Division responsibilities to the Ministry, to staff, and to the public involve a number of central services and administrative functions, such as public information; legal advice and action; staff recruitment and payroll preparation; office services, including allocation of accommodation and printing; purchasing; systems development; and financial administration, to ensure that expenditures comply with levels set in the annual estimates approved by the Legislature.

Improved financial controls and strict attention to purchasing practices reflected increased government concern about inflation and increased costs.

administrative services branch

The Administrative Services Branch was re-organized during the year to achieve increased efficiency. The Operating Services Section, comprising administrative, maintenance, and production units, was completely phased out. Normal position attritions made it possible to relocate most of the personnel affected in viable and productive positions. As planned, the Laboratory Stores Unit was transferred to the Laboratory Services Branch.

The Office Services Section maintained services to the Ministry in the following areas: the allocation of accommodation, the procurement of printing, records and forms management, mail and messenger services, assets control, head office stockroom functions, the Policy and Procedures Manual, and telecommunications services.

The Purchasing Unit maintained services and monitored purchasing commitments carefully to ensure adherence to Anti-Inflation Board guidelines. A task force was established to study the decentralization of purchasing functions for improved efficiency.

Systems Development made significant progress in the development of automated information systems such as the Sample Information System for the Water Resources Branch, the Utility Water Pollution Monitoring System for the Pollution Control Branch, the Utility Project Management System for the Project Co-ordination Branch, and the Utility Rate Information System for the Financial Services Branch.

The Systems Operation Unit accepted these new and modified systems for operation on a production basis. The

Unit developed other systems, including the Noise Pollution Survey and the Soft Drink Container Survey.

The Library Services Section increased the number of on-line computer databases to 64 to allow staff more efficient and faster access to information in head office and laboratory libraries.

The Cartography and Drafting Section provides cartographic, drafting, graphic design, and reprographic services to support Ministry programs. Requests for services increased 14 per cent this year,

financial services branch

The Branch provides financial services for the operating programs of the Ministry, administers the processing of transfer payments under The Pollution Abatement Incentive Act, and is responsible for the financial management of the Province's investment in water and sewage projects.

In 1976-77, the Branch developed and implemented a computerized program for the calculation of interim-financing interest related to the Ministry's investment in water and sewage treatment plants. It also improved the reporting of utility capital and operating expenditures.

The Ministry constructs, owns, and operates water and sewage treatment plants to service municipalities. To recover capital and operating costs, a service rate per 1,000 gallons is charged for actual water or sewage treated. During the year, the Branch conducted rate reviews of 48 of the 213 completed provincial projects.

It also developed an automated Utility Rate Information System to replace existing manual systems and to permit more frequent rate reviews.

Total Ministry revenues amounted to \$93,888,707.

FINANCIAL SERVICES BRANCH

TABLE OF GRANTS UNDER THE POLLUTION ABATEMENT INCENTIVE ACT

Fiscal Year	<u>Appropriation</u>	Claims	Actual <u>Amount</u>
1970/71	statutory	164	\$ 413,881
1971/72	2,000,000	559	1,944,889
1972/73	2,750,000	176	2,307,076
1973/74	3,750,000	249	1,571,963
1974/75	2,750,000	517	2,749,389
1975/76	3,250,000	564	3,242,125
1976/77	4,270,000	366	4,269,917
		2,595	
TOTAL ESTIMATED GRANTS FOR POLLUTION ABATEMENT			\$16,499,240

legal services branch

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any Director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

During 1976-77, the highest fines assessed under Ministry legislation moved up to \$16,500 from a previous high of \$10,000. The Branch also prosecuted the case against American Can under the Fisheries Act (a federal statute) which resulted in fines of \$64,000 -- the highest yet recorded for a pollution offence in Canada.

Other legal services included acting as counsel in arbitration hearings under construction contracts, advising on the appropriate application of the Ministry's powers, and advising on the form of documents and orders which can be issued by directors under the legislation. The Branch also provides legal advice to the operating branches and prepares Orders-in-Council, regulations, contracts, and orders.

personnel services branch

Training highlights included workshops for treatment plant operators, safety and first aid courses, and sewage treatment courses for employees of Ontario Hydro at the Bruce Peninsular Nuclear Power Station. Thirty-nine trainees from the Ministry, municipalities, and industry were certified as noise control officers while 59 Ministry staff were recertified in the identification of visible emissions. A total of 50 courses were held during the year involving 573 Ministry staff and 535 staff from municipalities, other provinces, and consultants.

The Women's Advisor was active in career counseling throughout the Ministry both on an individual basis and in group sessions. Career workshops for women were held in London, Belleville, and Ottawa. Through the Woman's Advisor the Ministry assisted in the validation of a resource guide for schools in Ontario prepared by the Ministry of Education.

A new classification system for management employees was introduced during the year. The system, known as "broadbanding", simplifies classification and pay administration by reducing the number of classes and pay grades required to compensate employees on the basis of significant differences in job complexities and responsibilities.

The finalization of the first set of collective agreements with the Government resulted in training sessions for all management staff and considerable discussions on contract administration. The Ministry's safety program was broadened by the appointment of five safety officers in the regions and one at the laboratory.

Staffing activity was confined primarily to the running of internal Ontario Public Service competitions and the placement of staff whose positions were declared redundant due to the Government's constraint program. Such allocations resulted in career-path changes for a number of the Ministry staff.

program planning and evaluation branch

The Branch conducts operational and policy evaluation studies relating to environmental planning, environmental control, resource recovery, and administrative support services. Its primary goals are: (1) to ensure a rational allocation of available resources to programs, and (2) to assess program effectiveness and efficiency.

The Branch develops the annual Estimates and acts as liaison with Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

Implementation of Management-by-Results involved establishment of a system for "The Provincial" lottery funds to be applied to health-oriented environmental projects.

Improvements were made to Management-by-Results programs already in use, including the Great Lakes Study. Following extensive financial analysis, the Branch revised fees and grants to Public Health Units for administration of agreements under Part VII of The Environmental Protection Act.

The Management-by-Results assessment process for

water and sewage works construction was amended to improve the integration of Ministry activities with urban development in the Province. A detailed evaluation of water and sewage works operating efficiency was conducted for the purpose of application to Management-by-Results in the immediate future.

During 1976-77, the Branch became increasingly involved in administration of financial and manpower controls imposed by the government. Part of this work included the cataloging of manpower and expenditure data for Ministry water and sewage treatment plants. Also, in collaboration with the Project Co-ordination Branch, an inventory of current capital construction projects was maintained. Management Board was kept informed quarterly of the status of water and sewage works and resource recovery plant construction.

internal audit branch

While the Branch was primarily engaged in the performance of financially-oriented audits, in-depth reviews were conducted in selected areas and specific ongoing expenditure and revenue transactions were monitored by the Branch on a continuing basis at the request of Management.

During the year the scope of the audits performed was expanded to include a more in-depth assessment of:

- (1) the validity and effectiveness of current financial and administrative procedures and internal controls;
- (2) the custody and protection maintained over Ministry Assets (properties, equipment, vehicles, etc.);

- (3) the control and security maintained over Ministry files and records;
- (4) the compliance of staff with established and approved policies, guidelines, and procedures.

As a result the observations and recommendations in the audit reports covered a much wider range of items than in prior years.

During the year the new audit programs with respect to regional offices were tested, and subsequently modified and expanded to accommodate the additional financial and administrative functions assumed by the regions.

Audits were also performed in the areas of revenue, expenditures, and disbursements, including cost-sharing agreements between the Ministry and the federal government. In addition, in-depth reviews were performed in the areas of the payroll reconciliation function and employees personnel records.

The Branch continues to review new procedures and proposed controls with staff of other branches.

information services branch

A variety of communications activities were planned and implemented to keep the public informed of the policies and activities of the Ministry and its operating divisions.

Projects of special significance included:

- in co-operation with the Pesticides Group of the Pollution Control Branch and the Ministry of

Health, the Branch developed an extensive public education campaign to promote residents' activity to control the breeding of mosquitoes as part of the program to combat encephalitis. The information campaign, including extensive advertising, was repeated in the Spring of 1977;

- preparation and distribution of extensive information and support material to explain Ontario's soft drink container regulations, including retailer signs informing the public of its right to refunds in cash for refillable bottles;
- increased communications support related to the work of the International Joint Commission, especially the activities of the Great Lakes Water Quality Board;
- advance promotion, publicity, and media relations for the Air Pollution Control Association's 70th annual conference in Toronto, June 1977;
- creation, design, and development of a new display, the Environment Arcade, which is aimed at a popular audience;
- major communications support for the York-Durham sewage project, the Industrial Waste Conference, Resource Recovery, Fish Contamination, and Metro Toronto lead contamination cleanup programs.

Communications support of the Ministry's six regions included: media liaison, exhibits and fairs, plant openings, public speaking engagements, and educational activities. Displays were staged at 17 exhibitions and fairs and official opening ceremonies were held for 14 new water treatment and sewage plants.

In addition to regional fairs, the Ministry was represented in six major exhibitions -- London, Thunder Bay, Ottawa, Kingston, and Toronto. Approximately 1,000,000 people visited the Ministry's four major displays presenting information on Resource Recovery, Horticulture, Water Quality, and the Environment Arcade.

Production of brochures and "Fact Sheets" were expanded by 22 to a total of 105 publications, 23 of which are also published in French. Approximately two million brochures were distributed during the year and a large quantity of promotional badges were used in the Ministry's education programs.

"Legacy", the Ministry's bi-monthly external newspaper with a circulation in excess of 20,000 received awards for quality design and management from the Toronto Chapter, International Association of Business Communicators.

Four new educational "Fact Sheets", two slide shows, posters, and a coloring/comic book, designed to help teachers were developed as part of the educational program and educational activities were conducted in 13 children's camps and seven provincial parks during the Summer.

Ten audio/visual shows were prepared as information support for a variety of Ministry programs. A film on the Kawartha Lakes Weed Harvesting Program was initiated and documentation for a film on the York-Durham project and a photographic display prepared and circulated to six libraries. Extensive photographic evidence and aerial photography work for the Legal Branch, was provided.

boards and commissions

the waste management advisory board

Chairman: R.H. Woolvett

Established by Order-in-Council in 1975, the Waste Management Advisory Board formulates policy and advises the Minister of the Environment on matters pertaining to the management of waste in Ontario. The Board places particular emphasis in its work on waste reduction, recovery, and recycling.

The Board consists of 11 members. In January 1977, Mr. Andrew Grant, a representative of the packaging industry was appointed to the Board. In March 1977, Board member, Mr. Peter Eberlee, was named Vice-Chairman by Order-in-Council effective April 1. The Board held 14 meetings totaling 25 days in 1976-77.

Beverage Packaging Studies

The Board continued investigations concerned with reducing the environmental impacts associated with the packaging of carbonated soft drinks, non-carbonated soft drinks, wine and spirits, and milk.

Concerning carbonated soft drinks, the Board reviewed many submissions from all segments of the soft drink industry about the provisions of Ontario Regulation 687/76. The Regulation was subsequently amended by the

provisions of Ontario Regulations 114/77 and 146/77.

The Board initiated development of design specifications for two sizes of standard refillable bottles for carbonated soft drinks. It engaged a consulting firm: (1) to determine the reactions of the bottlers of carbonated soft drinks to these designs, and (2) to estimate the costs and other impacts of converting to a standard refillable bottle system on a voluntary basis. At year-end, standard bottle development was still in progress.

The Board initiated a study of non-carbonated soft drink containers. The Board engaged a consultant to conduct a wine and spirits packaging study and distributed the resulting report to interested parties for comment. The Board also completed a study on milk packaging which, at year-end, was awaiting distribution to interested parties for comment.

Waste Management

In July 1976, the Board submitted a report to the Minister on the quantity and composition of urban wastes in Ontario. Report data is intended for interim use by government and other agencies until more definite figures become available. The Board also prepared terms of reference for a waste management, cost-evaluation, and cost-monitoring system study to be executed by a consulting firm in 1977-78.

The Board analyzed and evaluated 12 existing projects for the separation-at-source of residential wastes, and developed recommendations for the design of a pilot program for Ontario. Execution of the program was referred to the Resource Recovery Branch. The Board also initiated a glass markets study which will be completed by the Resource Recovery Branch.

In June 1976, the Board initiated a pilot project in

its own offices and in the offices of the Resource Recovery Branch to determine the viability of source-separating white ledger paper from office waste. The Board was also involved in a study to increase the recycling of waste-paper from federal and provincial office buildings in the Toronto area.

the environmental assessment board

Chairman: D.S. Caverly

The Environmental Assessment Board was established on April 20, 1976, through advanced proclamation of certain sections of The Environmental Assessment Act, 1975. Composed of 13 part-time members and a full-time chairman, it is essentially a group of "lay" persons drawn from all walks of life and different parts of the Province.

The Board was formed to conduct hearings required under The Environmental Assessment Act and to continue with hearings required under The Ontario Water Resources Act, 1970 and The Environmental Protection Act, 1971. (Prior to the Board's formation, hearings under the latter two Acts were conducted by the Environmental Hearing Board.) The Ontario government can also empower the Environmental Assessment Board to undertake special hearings on environmentally oriented matters through Orders-in-Council.

During its first year of operation, the Board did not conduct any hearings under The Environmental Assessment Act largely because the part of the Act requiring environmental assessments was not proclaimed until October 1976. The Board did conduct 18 hearings under The Ontario Water Resources Act concerning sewage-works sites and sewer systems, and 14 hearings under The Environmental Pro-

tection Act concerning sites for landfilling, resource recovery, liquid industrial waste disposal, and composting.

The Board also began a hearing, as directed by two Orders-in-Council, concerning uranium mine expansion to be undertaken in the Elliot Lake area by Rio Algom Mines Limited and Denison Mines Limited. Main subject of consideration was Volume I of a report prepared by the two mining companies according to Ministry guidelines. Purpose of the report is to indicate the social and environmental effects of the mine expansion program as well as alternatives for mitigating these effects.

the pesticides advisory committee

Chairman: Dr. D.N. Huntley

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the Act, its Regulations, and government publications concerning pests and pesticides. The Committee also enquires into matters concerning pesticides and the control of pests as deemed necessary or as prescribed by the Regulations.

The Committee consisted of 14 members in 1976-77 representing agriculture, industry, universities, and government. Several membership changes took place by Order-in-Council: Dr. D. Harding was appointed to represent the Ministry of Health; Dr. R.A. Campbell, Ministry of Natural Resources, filled the vacancy caused by the death of Mr. K.B. Turner in August 1976; Dr. J.R. Carrow was appointed to serve the remainder of Dr. Campbell's term in March 1977.

The Committee recommended several changes to Ontario Regulation 618/74 as reflected in Ontario Regulation

577/76; reviewed and evaluated the environmental impact, toxicity, and hazard of 13 new pesticide-active ingredients; re-assessed three previously reviewed compounds; reviewed 198 newly registered pesticide products and recommended for each a classification for storage, sale, and use in Ontario; and updated the guidelines for classification. A publication entitled "Ontario Classification of Pesticide Products" was released and distributed to registrants in October 1976.

The Committee continued a research program established in 1973 with three major objectives:

- (a) to find alternative pesticides for those deemed environmentally hazardous and those restricted in use;
- (b) to determine potential environmental hazards with pesticides currently in use;
- (c) to reduce pesticide input into the environment.

The Committee received 29 research proposals; 20 of them were funded by the Ministry through the Committee at a total cost of \$149,372. A two-day research seminar was held in January 1977 at which fund-recipients presented progress reports.

All 1976-77 publications of the Ministries of Agriculture and Food, Environment, and Natural Resources concerned with pesticides were reviewed and endorsed prior to printing and distribution. A compendium of pesticide products by company was compiled for distribution in April 1977.

the environmental appeal board

Chairman: I.W. Pasternak, Q.C.

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry or local health units. It consists of seven part-time members, including the chairman, from various occupations and parts of the Province.

In 1976-77, the Board received 68 notices of appeal and held 37 hearings in various locations. Over 80 per cent of the appeals concerned applications for private sewage disposal systems which had been refused by the Ministry or a local health unit. The remaining appeals resulted from Ministry decisions regarding waste disposal sites, sewage and water works, and air pollution situations.

The Board dealt with 45 of the appeal notices received; the remaining 23 appeals are to be heard in 1977-78. Also dealt with in 1976-77 were 21 appeals received in 1975-76.

the pesticides appeal board

Chairman: J.R. Swanborough, Q.C.

Established under The Pesticides Act, 1973, the Pesticides Appeal Board provides an appeal mechanism for persons affected by Ministry decisions regarding the licensing of pest control operators and exterminators, and the use and control of pesticides. It consists of a part-time chairman and six part-time members.

In 1976-77, the Board received 22 Notices of Appeal. One appeal concerned the Ministry's intention to issue a Control Order regarding the handling of a pesticide; another, a refusal to issue an operator's license. The remaining 20 appeals stemmed from Ministry refusals to issue permits for the use of given pesticides.

The Board dealt with 11 of the appeal notices received; the remaining 11 appeals are to be heard in 1977-78. Also heard in 1976-77 were four appeals received in 1975-76.

the farm pollution advisory committee

Chairman: Otto Crone

The Farm Pollution Advisory Committee is comprised of four farmers. Otto Crone and Harold Eubank of Hagersville, Donald Switzer of Smithville, and John K. Peart of Caledonia. Its concern is to provide objective assessments of farm environmental situations. When requested by

Ministry officials, the Committee visits farms to investigate complaints and makes recommendations that should be employed regarding manure storage, spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

In 1976-77, five farms were visited at the Ministry's request. One poultry, one dairy, one hog, and two beef farms. The Committee made recommendations of improvement of three of the farms visited, which are delivered to farmers through the Ministry.

Some of the 1976 complaints have been regarding canning factory vegetable waste which is being stored by farmers and used as beef cattle feed. The Committee had a meeting with representatives from the canning industry, the feed industry, Ministry of Agriculture, and Environment staff, to alert them of the complaints and to explore the possibility of improved handling methods.

More study of the use of vegetable waste will continue during the 1977 canning season.

the mammalian and avian pest management committee

Chairman: K.G. Laver

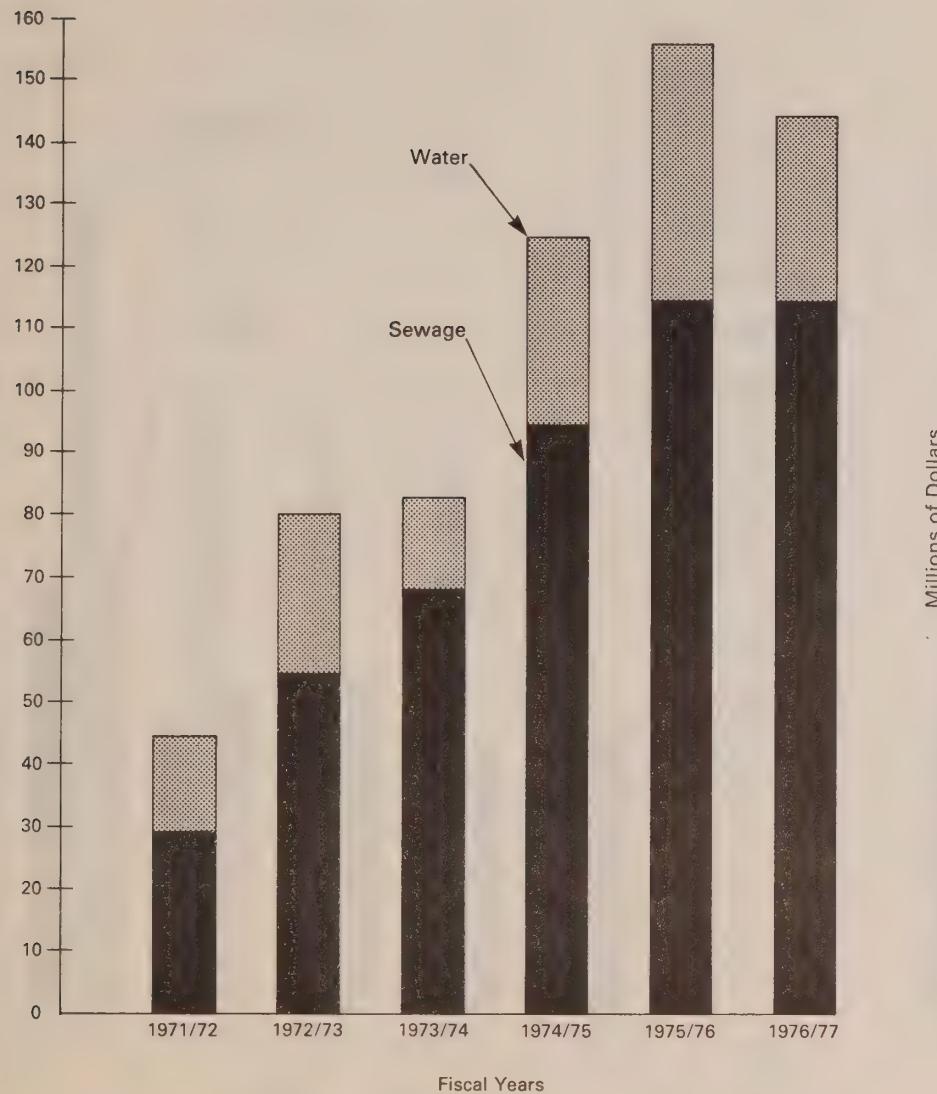
The Mammalian and Avian Pest Management Committee was appointed to advise the Ministry on the human control of animal and bird pests. Its members represent the Ministries of Health, Agriculture and Food, Natural Resources, the Environment, and Treasury, Economics and Intergovernmental Affairs, as well as several federal government departments and a wide range of public groups interested in animal welfare.

The Committee supervises research funds related to vertebrate problems being studied at Guelph, Toronto, and Ottawa universities. It recently submitted a study for ratification by a government steering committee on municipal authority and procedures governing the control of dogs in Ontario. Under way are control studies on blackbirds, beavers, and coyotes as related to agricultural predation or damage.

On completion of these projects, the Committee will be dissolved.

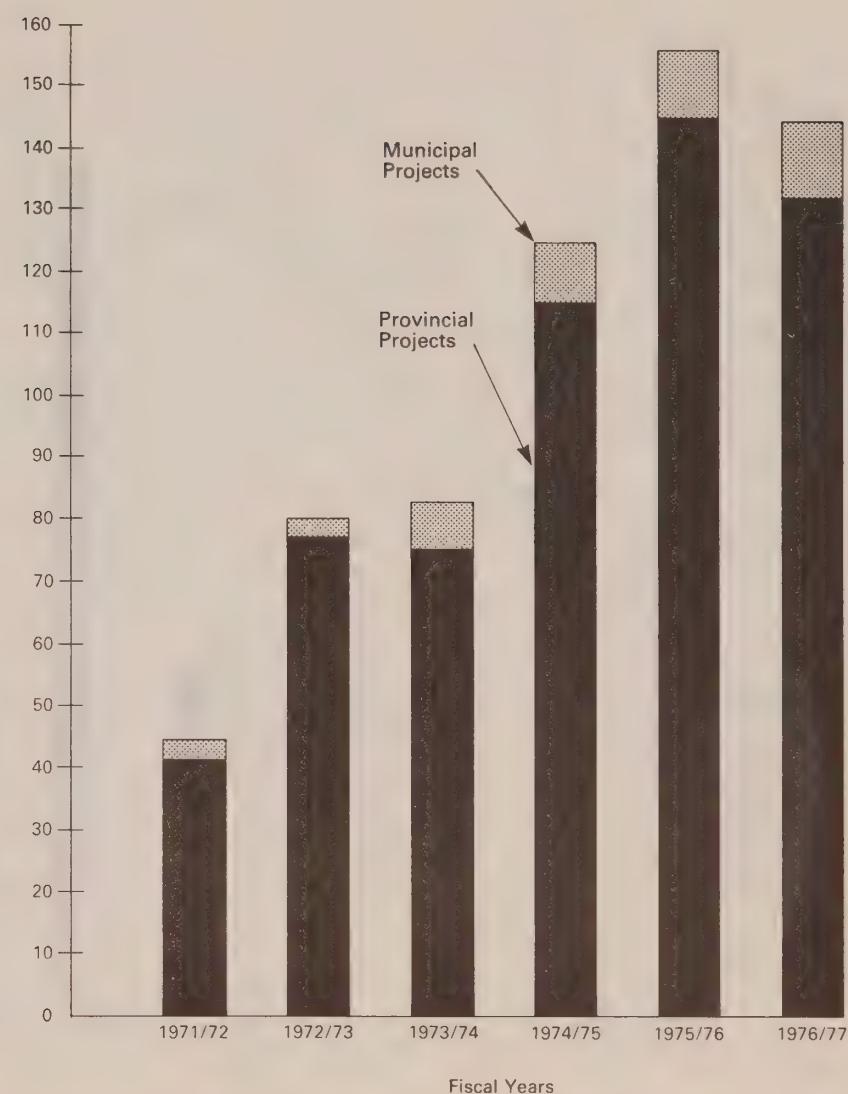
APPENDICES

ANNUAL TOTAL EXPENDITURE BY PROJECT TYPE
(1971/72 — 1976/77)



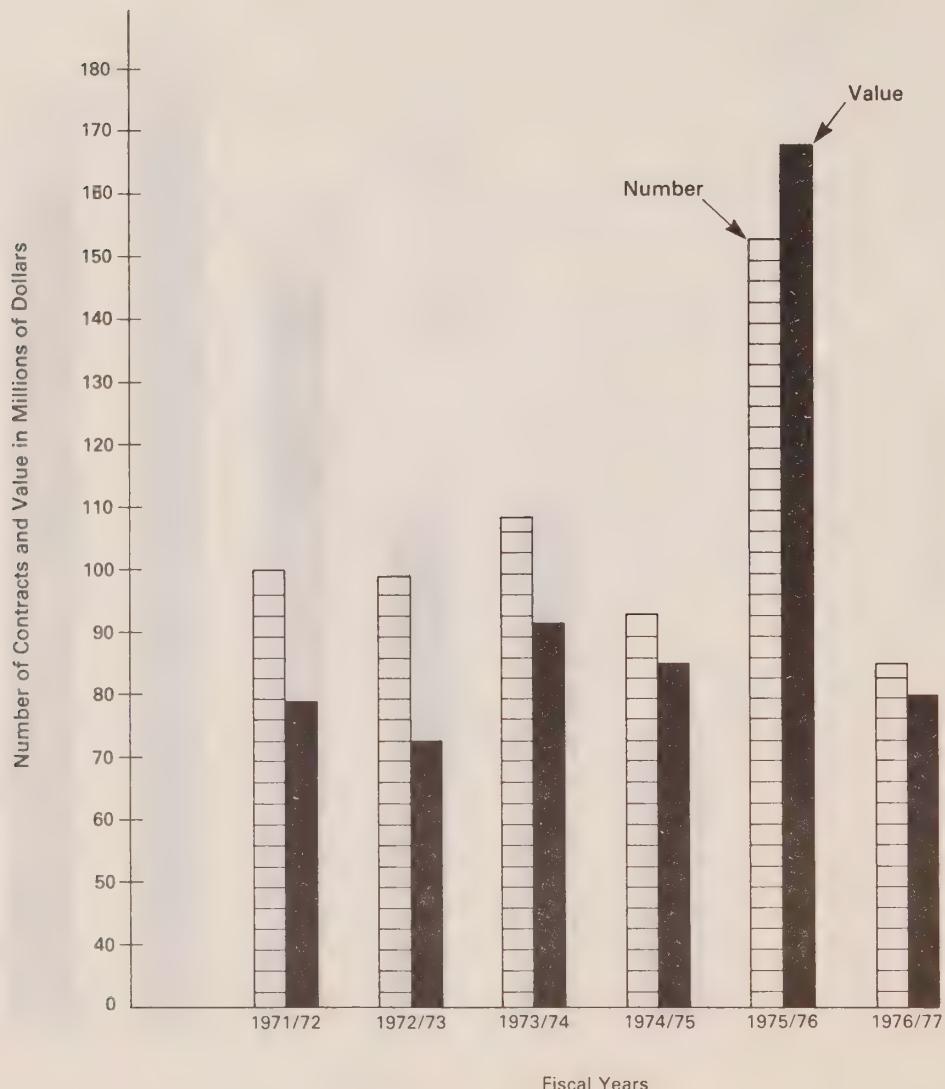
GRAPH I

ANNUAL TOTAL EXPENDITURE BY CLASS
Capital Construction Program
(1971/72 — 1976/77)



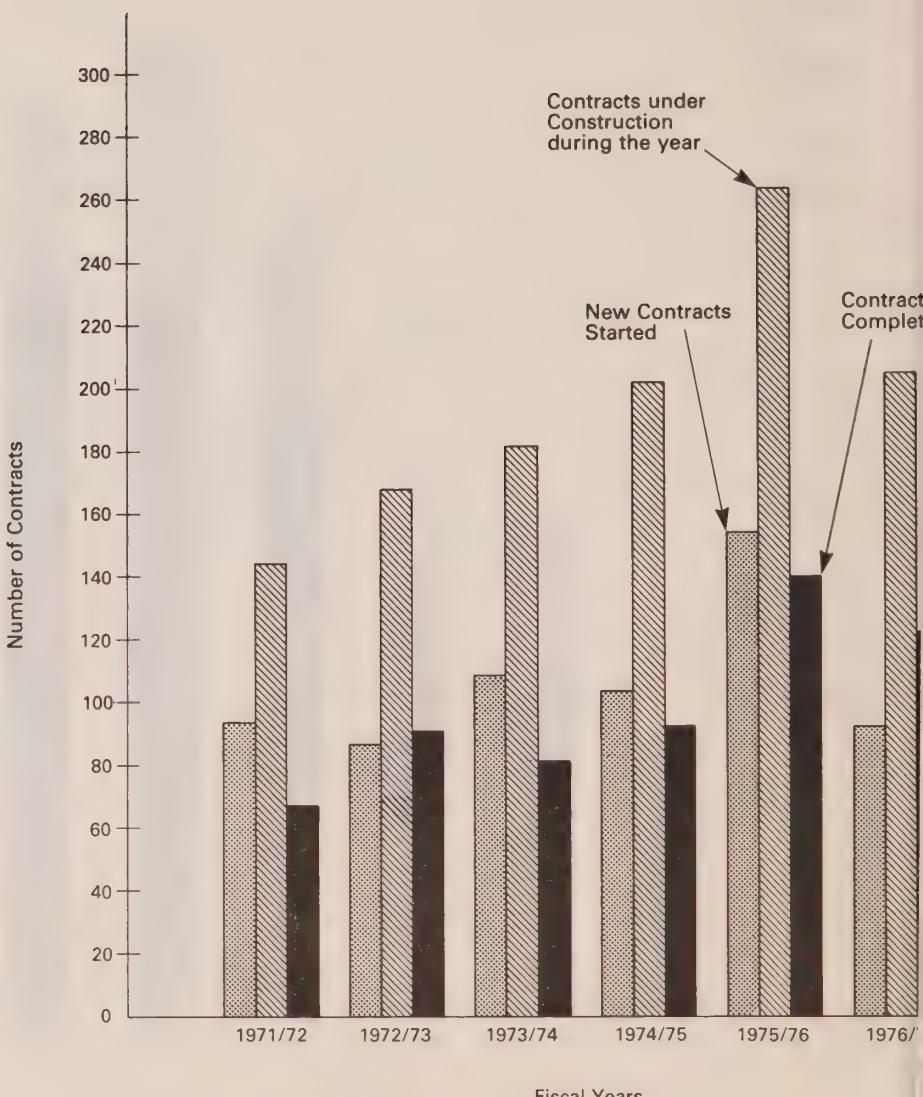
GRAPH II

NUMBER AND VALUE OF CONTRACTS TENDERED ANNUALLY
(1971/72 to 1976/77)



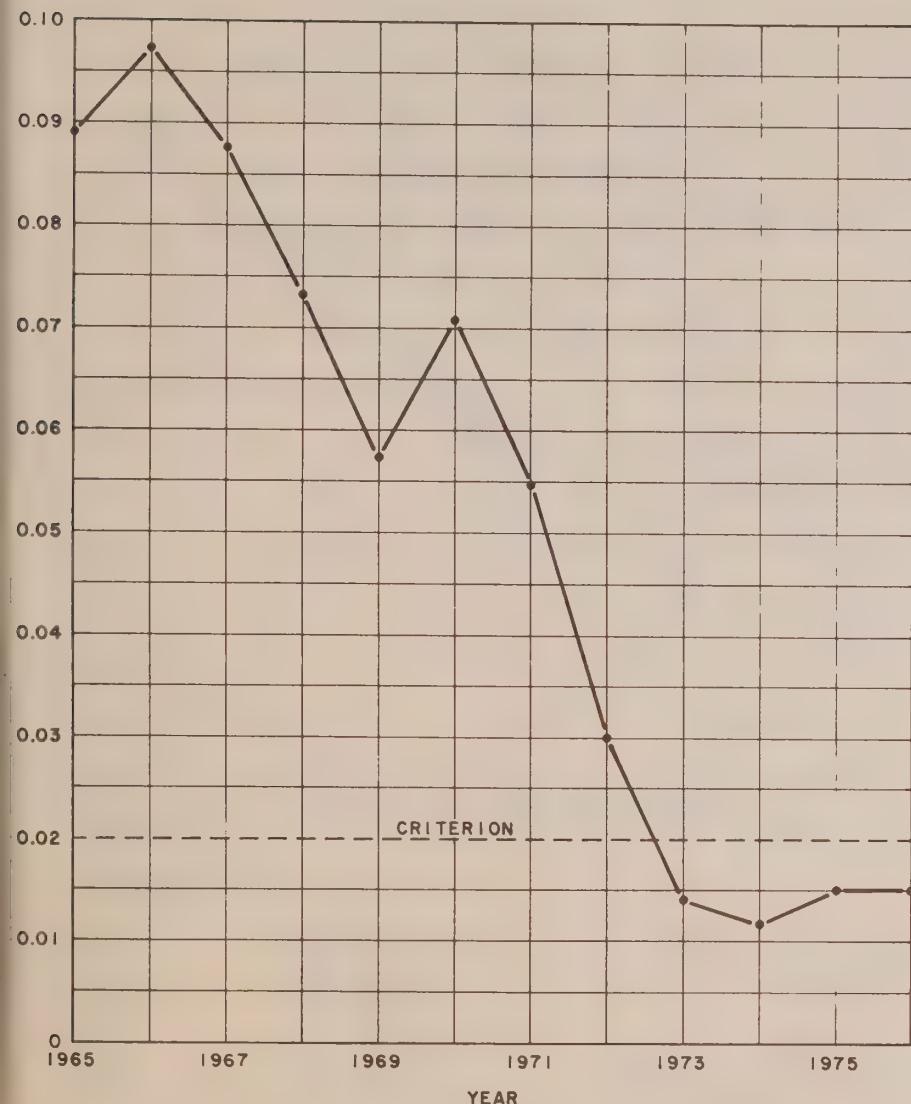
GRAPH III

ANNUAL VOLUME OF ACTIVITY
(1971/72 — 1976/77)



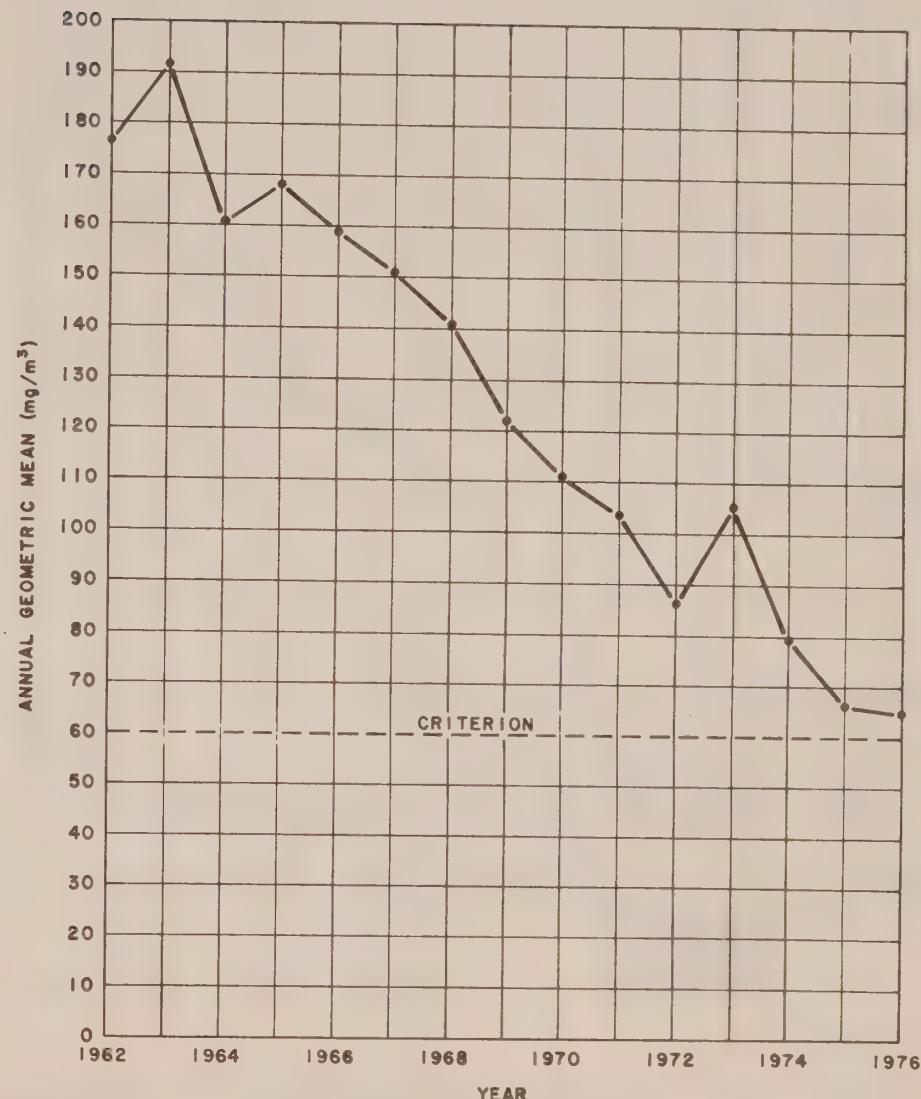
GRAPH IV

SULPHUR DIOXIDE IN DOWNTOWN TORONTO



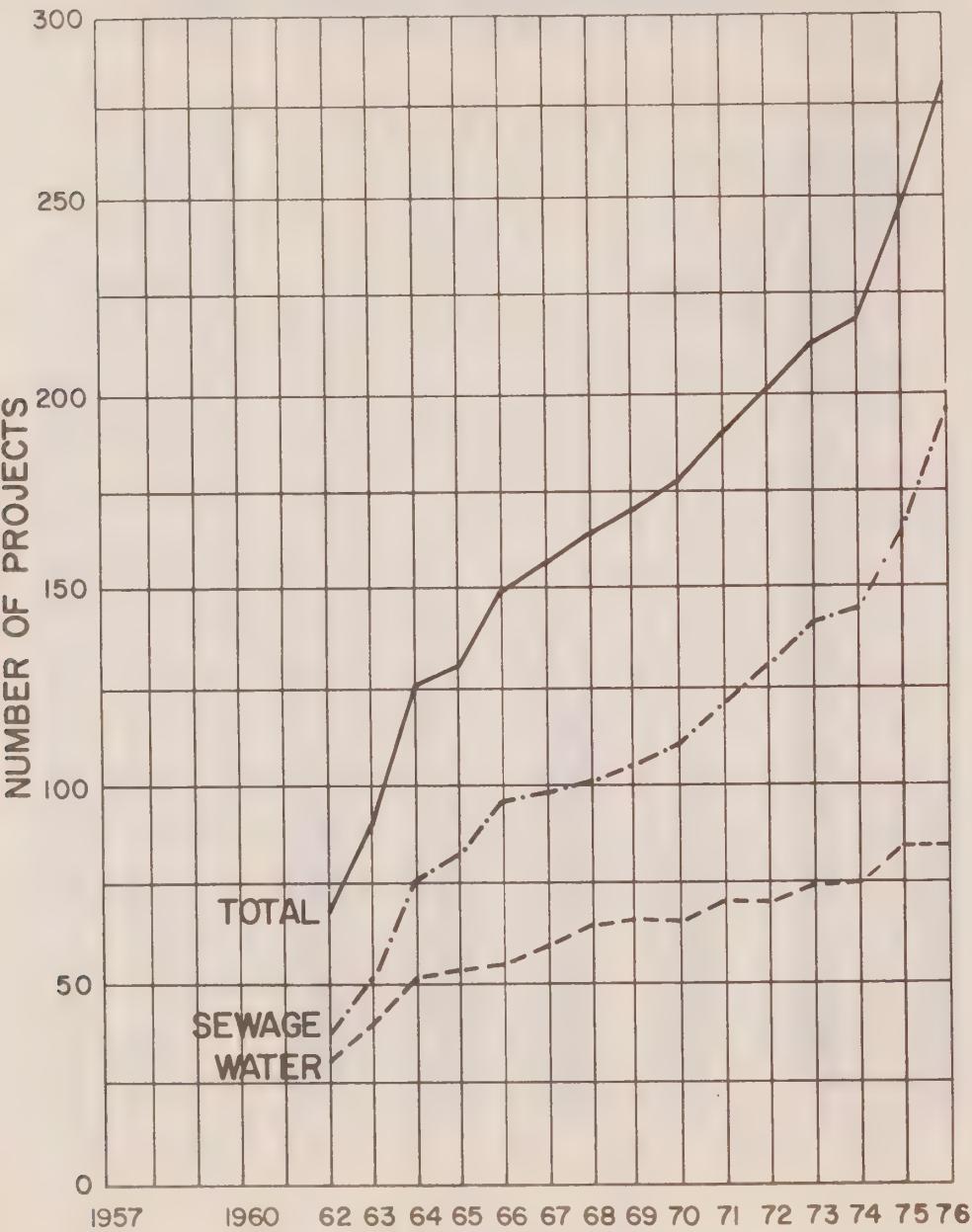
GRAPH V

SUSPENDED PARTICULATES IN DOWNTOWN TORONTO



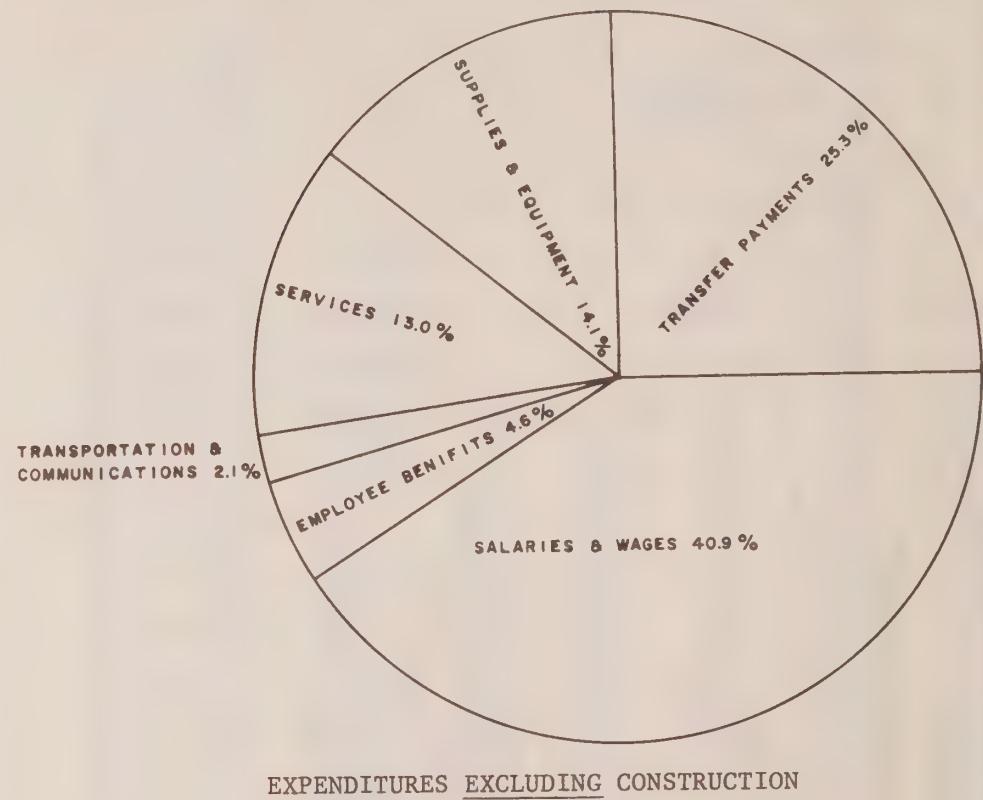
GRAPH VI

PROJECTS IN OPERATION



GRAPH VII

DISTRIBUTION OF OPERATING COSTS FISCAL YEAR 1976-77



	%
Salaries & Wages	40.9
Benefits	4.6
Travel	2.1
Services	13.0
Supplies & Equipment	14.1
Transfer Payments	25.3

GRAPH VIII \$92,396,736

100%

CENTRAL REGION

TORONTO AIR POLLUTION INDEX LEVELS

Year	Number of Occasions Exceeding		Maximum Level and Date
	Maximum Desirable Level	First Alert Level	
	32	50	
1970*	17	2	56 Oct. 8
1971	19	1	52 Apr. 13
1972	2	Nil	45 Feb. 13
1973	3	Nil	43 Oct. 24
1974	3	1	50 Oct. 29
1975	2	1	62 Nov. 26
1976	1	Nil	33 Oct. 3

* Started March 23, 1970





6

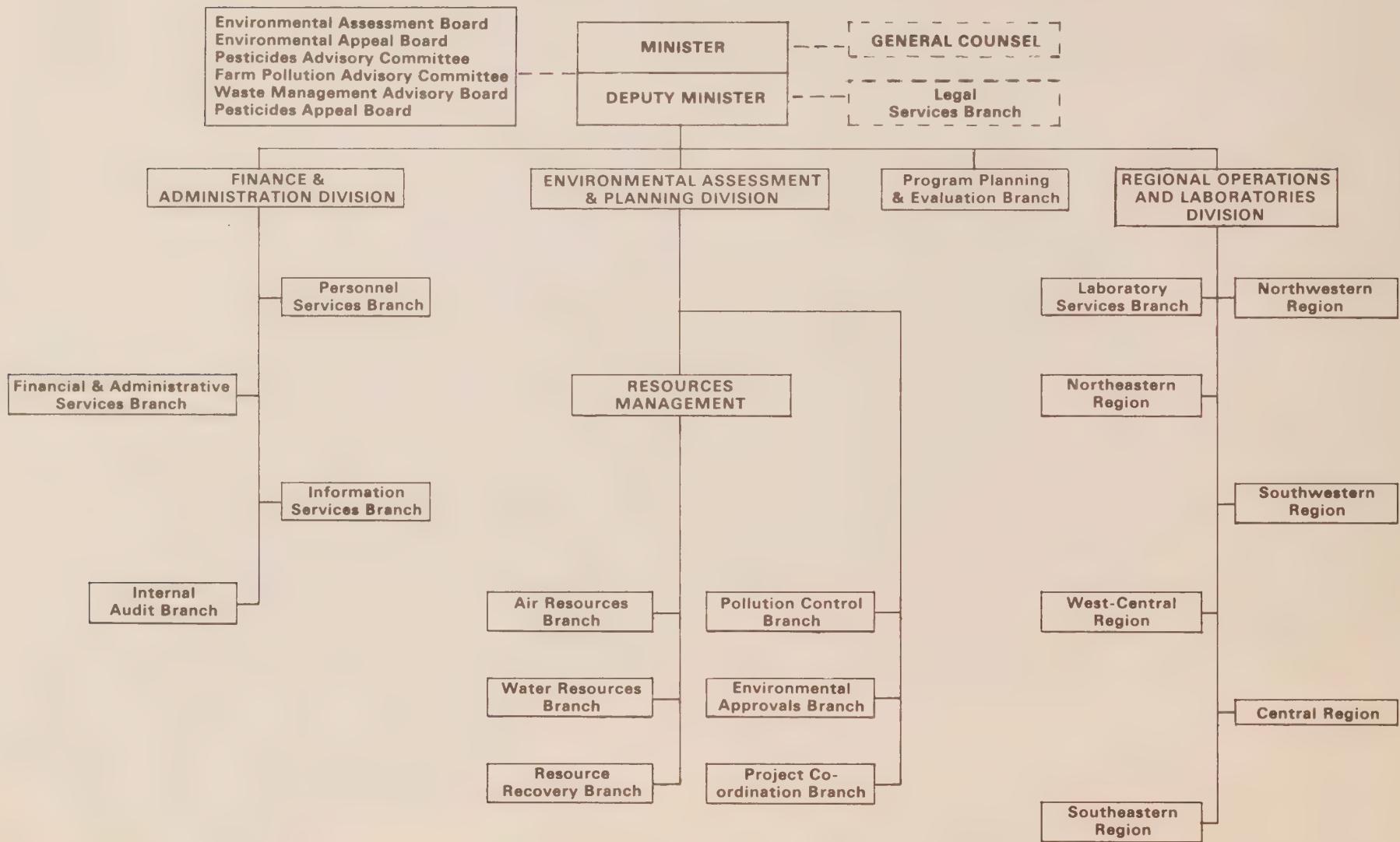
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Ministry of the Environment

Annual Report 1977-78

MINISTRY OF THE ENVIRONMENT — APRIL 1, 1977 - MARCH 31, 1978



contents

Organization Chart	Frontispiece	
Letters of Transmittal	2	
Goals and Achievements, 1977-78	3	
<u>Environmental Assessment & Planning Division</u>	7	
Air Resources Branch	7	
Water Resources Branch	10	
Pollution Control Branch	19	
Environmental Approvals Branch	27	
Project Co-ordination Branch	30	
Resource Recovery Branch	32	
<u>Regional Operations and Laboratories Division</u>	35	
Northwestern Region	35	
Northeastern Region	37	
Southwestern Region	40	
West-Central Region	43	
Central Region	45	
Southeastern Region	47	
Laboratory Services Branch	48	
<u>Finance and Administration Division</u>	53	
Financial and Administrative Services Branch	53	
Legal Services Branch	55	
Personnel Services Branch	56	
Program Planning and Evaluation Branch	57	
Internal Audit Branch	58	
Information Services Branch	58	
		<u>Boards and Commissions</u>
		The Waste Management Advisory Board
		The Environmental Assessment Board
		The Pesticides Advisory Committee
		The Environmental Appeal Board
		The Pesticides Appeal Board
		The Farm Pollution Advisory Committee
		<u>Appendices -- Charts and Tables</u>
		Annual Total Expenditure by Project Type (1972-73 - 1977-78)
		Annual Total Expenditure by Class. Capital Construction Program (1972-73 - 1977-78)
		Number and Value of Contracts Tendered Annually (1972-73 - 1977-78)
		Annual Volume of Activity (1972-73 - 1977-78)
		Test Load Distribution, 1977-78
		Test Distribution by Program, 1977-78
		Table I - Capital Construction Program -- Volume of Activity 1977-78
		Table II - Tests Performed, 1977-78 -- Laboratory Services Branch
		Table III - Student Intake, Training & Certification Section -- April 1977 - April 1978
		Table IV - Ontario Air Pollution Index Average Readings



To:

The Honourable
Harry C. Parrott, D.D.S.,
Minister.

Sir,

I have the honour to submit
for your approval the annual
report of the Ministry of
the Environment for the year
1977-78.

Respectfully submitted,

Kenneth H. Sharpe
Deputy Minister



To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1977, and ending
March 31, 1978.

Respectfully submitted,

Harry C. Parrott,
Minister

The Honourable Harry C. Parrott, D.D.S., was appointed Ontario Minister of the Environment on August 18, 1978, transferring from his former portfolio as Minister of Colleges and Universities, an office he held since October 7, 1975.

Serving as Minister of Environment Ontario during the fiscal year 1977-78, were the Honourable George R. McCague and the Honourable George A. Kerr, Q.C.

Mr. McCague served as Minister from January 21, 1978 to August 18, 1978, when he was appointed as Chairman of the Management Board of Cabinet.

Mr. Kerr served as Minister from October 7, 1975 to January 21, 1978, when he was appointed Provincial Secretary for Justice, and Solicitor General.

goals and achievements, 1977-78

Ontario's pioneering commitment to environmental protection has resulted in the development of legislation, of research programs, and of policies which have made the Province a recognized leader in the environmental field.

The Ministry was established in 1972 to consolidate responsibility for all aspects of environmental protection, enhancement, and restoration under one agency of the Ontario Government. The operating legislation of the Ministry includes legislation which established previous agencies and now comprises:

The Ontario Water Resources Act,
The Environmental Protection Act, 1971
The Pesticides Act, 1973
The Environmental Assessment Act, 1975

goals

To provide the eight million citizens of the Province with effective environmental management, Environment Ontario has set four major long-term objectives:

- to control contaminant emission;
- to establish environmental safeguards to protect human health and the natural environment;
- to manage Ontario's water resources and to manage waste;
- to develop and maintain measures to preserve, restore, and enhance the natural environment.

The Ministry is organized for the provision of a wide range of services through a regional structure, established in 1974. Direct services are provided from six major regional bases and 23 district offices which serve as key delivery points for inspection and pollution abatement activities and local approvals in order to bring service and control functions closer to the people they affect.

A close working relationship is maintained with municipalities, with the Ministry providing consultation and development services with regard to water management and pollution control. As part of this tradition of service the Ministry itself has constructed and operates more than 300 water and sewage treatment plants, and works closely with municipalities to help them develop and maintain their water and sewage treatment facilities.

achievements

During 1977-78, the Ministry advanced toward its goals on many fronts. The activities and achievements of Ministry programs are reported herein by Divisions, Operating Branches and Regions, and include the following highlights of the year's progress:

environmental health

- The Ministry assumed the co-ordinating role in the Fish Contaminants Program -- including responsibility for fish testing and dissemination of public information -- in co-operation with the Ministry of Natural Resources and with medical advisors of the Occupational Health and Safety Division of the Ministry of Labour. Five publications containing comprehensive guidelines on the consumption of sport fish from 450 Ontario lakes and waterways were published and made available to the public in April 1978. Prior to publication, and as test results were completed, 12 environmental health bulletins

were prepared and distributed monthly. During 1977-78, about 13,000 fish, weighing approximately six tons, were analyzed for trace contaminants;

- Nine health-related environmental research projects were approved for funding through the Provincial Lottery Trust fund at a total cost of \$1.0 million;
- The Mosquito Control Program undertaken in co-operation with the Ministry of Health contributed to successful control of mosquito populations for the second consecutive year: no human cases of encephalitis were reported during 1977-78;
- An asbestos monitoring program affecting all municipal water supplies was initiated as a result of new monitoring technology. To safeguard public health against any contaminants, a total of 12,000 drinking water samples were analyzed throughout the Province to ensure that community water supplies are potable.

resource recovery

- The Ontario Centre for Resource Recovery at Downsview, including the experimental plant and laboratory, was completed and opened in August of 1978, as the first facility of its kind in Canada, and the fourth to be constructed in the world.

new service systems

- The construction of 70 miles of trunk sewer and the 160 million gallon per day sewage treatment plant for the York-Durham project was on schedule for the target opening in 1980, the biggest single servicing project ever undertaken by the Ministry;
- Eleven new sewage treatment plants and nine new water treatment plants were put into service across

the Province. At year-end, 343 communal sewage works with a total design capacity of 1.1 billion Imperial gallons per day were in operation. Water works in the Province numbered 467 with a total design capacity of 2 billion Imperial gallons per day.

great lakes

- Progress was made in research, surveillance, and monitoring to clean up pollution in the Great Lakes under the Canada-Ontario and the Canada-United States Great Lakes Water Quality agreements. At year-end over 210 sewage treatment plants, or 85 per cent of the total hydraulic capacity of all sewage plants in the Province, were undertaking phosphorus removal;
- The Pollution from Land Use Activities Reference Group (PLUARG) study under the International Joint Commission, designed to remedy pollution to the Great Lakes from land runoff, was completed.

recreational lakes

- Extensive surveys and monitoring of water quality continued in Ontario inland recreational lakes and watersheds, including field work in connection with the Lakeshore Capacity Study designed to quantify the effects of cottage development on lake water quality, and provide acidic precipitation data.

monitoring and sampling

- Expansion of the Ministry's laboratories and services, including the addition of new scientific equipment and research facilities to improve capabilities in the detection, analysis, and control of environmental contaminants, enabled the laboratories to respond to an eight per cent increased demand for tests of all

kinds, which totalled 1,780,000 in number;

- Progress was achieved in air monitoring techniques and air quality improvement, and the Air Pollution Index daily monitoring system extended to include the City of Sarnia.

environmental studies

- Major environmental studies were in progress at Nanticoke, Sudbury, Elliot Lake, Port Grandby and elsewhere. The Nanticoke Environmental Management Program (NEMP) was established as a joint undertaking of the Ministry with Ontario Hydro, Environment Canada, Texaco, and the Steel Company of Canada to ensure maximum environmental safeguards when the huge industrial, chemical, and hydro complex becomes fully operational. The site will be one of the most thoroughly and intensively monitored areas in the world to ensure a clean environment;
- Environmental engineering reviews and approvals were carried out on major Ontario Hydro projects, and submissions presented to the Royal Commission on Electric Power Planning, including Ministry views on significant environment policy matters related to nuclear plants.

contaminants research

- The Ministry's Hazardous Contaminants Program was expanded, and significant findings obtained through research and surveys conducted by the Hazardous Substances Committee's four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. The Committee is inventoring industrial establishments in the Province to determine the use and handling of a selected number of chemicals which could have a hazardous reaction on health or the natural environment, and is working in close liaison with Environment Canada.

environmental assessment and planning division

Assistant Deputy Minister: J.W. Giles

Executive Director: W.B. Drowley

air resources branch

Director: A.J. Harris

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology, and recommendations concerning air quality criteria and standards.

Air Quality & Meteorology Section

This Section maintains the Ontario air monitoring network which, in 1977-78, consisted of 1,400 air quality and meteorological instruments in continuous operation in 100 areas. Altogether, 2.5 million data points were computer processed and assessed. An air quality trend analysis for the period 1971-77 inclusive shows a marked improvement in the levels of sulphur dioxide, suspended particulate matter, and carbon monoxide in all major cities of the Province. Nitrogen dioxide and hydrocarbons (precursors for the formation of photochemical oxidants) and ozone, monitored since 1974, do not show a consistent trend.

The Air Pollution Index, the basis of Ontario's Alert System, continued to be publicized daily for Windsor, Hamilton, Toronto, Sudbury, Welland, Niagara

Falls, New Sudbury, and Coniston. It was expanded to include Sarnia in 1977.

The Section used air quality models in transboundary studies to predict the air quality impact of the proposed Ontario Hydro Atikokan Generating Station in Quetico Park located in the boundary area of Ontario and Minnesota. The results indicated that both Ontario and Canadian short- and long-term air quality standards would be met and there should be no adverse effect on vegetation in the area resulting from the emissions of this plant. An air monitoring program was being planned to verify these predictions.

The Section updated the air pollutant emission inventory used in air pollution modelling and expanded it to cover most of Ontario. Data was provided to Environment Canada and the U.S. Environmental Protection Agency to carry out pollution studies on an international scale.

The Section carried out the wind trajectory analyses for acid rainfall in central Ontario during 1977. The analyses show that emissions from smelters in the Sudbury area provide a minor contribution to the rainfall acidity reported.

Criteria Development and Program Planning Section

In 1977-78, this Section established 12 guidelines for new contaminants in Ontario and prepared detailed reports for seven environmental appraisals. Section members also worked with six federally-organized task forces to produce regulations or guidelines for various industries.

The section developed a formal procedure for Ministry participation in the enforcement of federal regulations and guidelines in Ontario. Using this procedure, the Section made recommendations for Ontario's participation in the enforcement of federal regulations for the

secondary lead smelting industry and the asbestos mining and milling industry.

Phytotoxicology Section

The Phytotoxicology Section conducted soil and vegetation assessment studies near 104 industrial and other sources in southern Ontario in 1977-78. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated more than 200 vegetation complaints from the public of which 50 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, and the Board of Negotiation.

In 1977-78, the Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit, and glass. The Section also investigated the effects of sulphur dioxide, lead, ammonia, boron, ethylene, nickel, cobalt, and mercury emitted by various industries in southern Ontario. In the City of Toronto, lead-contaminated soil was replaced on residential properties adjoining several industries.

During the 1977 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree and extent of photochemical oxidant (ozone and/or peroxyacetyl nitrate) injury on the following crops: white bean, tobacco, tomato, potato, and muck crop vegetables. The degree of oxidant injury to crops was either similar or slightly more severe in 1977 as compared to 1976.

At Nanticoke, the Section continued pre-operational baseline studies where major operations by Ontario Hydro, Stelco, and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the

study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 9,807 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology, and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation were developed for 19 contaminants. The Section also conducted 19 research studies both in the field and in controlled environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

Phytotoxicology displays on the effects of various contaminants on vegetation were shown at the Plant Show in April, the International Air Pollution Control Association Conference in June, and the International Plowing Match in September.

During 1977, five Phytotoxicology papers were published in scientific journals, eight papers were presented to technical conferences, and 23 extra-ministerial activities were undertaken by Phytotoxicology staff in conjunction with provincial, national, and international committees and task forces.

Technology Development & Appraisal Section

This Section commenced work on a major new study -- the Nanticoke Environmental Management Program (NEMP). NEMP is a joint undertaking of the Ministry of the Environment, Ontario Hydro, Environment Canada, Texaco, and Stelco. A program co-ordinator and a project scientist were hired, and technical and management committees, with each partner represented, were formed. Air monitoring equipment for gases, particulate matter, and precipitation was acquired. When the network is fully operational, Nanticoke will be one of the most thoroughly and intensively monitored areas in the world.

The Sudbury Environmental Study continued with increasing emphasis on air pollution aspects. A wet-only precipitation network was installed and operated. Other atmospheric aspects included SO₂-to-sulphate oxidation-rate studies, meteorological measurements, measurement of pollutant emissions, air mass trajectory analysis and model development (jointly with the Air Quality and Meteorology Section).

Co-ordination of various components of the Ministry's Hazardous Contaminants Program improved through the operation of the Hazardous Substances Committee and the creation of the following four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. These working groups are composed of staff from various Ministry branches. Significant progress was achieved in a number of program aspects, including: ambient air surveys for PAHs, PCBs, alkyl benzenes, and chlorinated hydrocarbons; completion of a survey of potential sources of PAHs; the preparation of comprehensive background reports on the environmental aspects of chlorinated and aromatic hydrocarbons and radioactive substances.

The Research Grants Program provided grants in aid of atmospheric pollution research to 19 principal investigators from universities across the Province. The grantees presented their findings at a series of public seminars held in February and drew enthusiastic response from government agencies, crown corporations, universities, and industry.

Two committees played lead roles in dealing with malodour problems from automobile painting operations and restaurants. Work included emission measurements and evaluations of various methodologies and technologies of malodour control.

The Section continued work on the evaluation of new control technologies (wet scrubbers and incineration) for controlling particulate and gaseous emissions.

Mobile ambient air monitoring, in support of various Ministry air pollution control programs, was carried out at many locations throughout the Province including Nanticoke, Mississauga, Sarnia, Petrolia, Marathon, Terrace Bay, Thunder Bay, Red Rock, and Sudbury. The surveys monitored SO₂, particulate matter, sulphates, nitrates, PCBs, total hydrocarbons, various trace metals, ammonia, NO_x, O₃, and H₂S.

Work continued on source-testing procedures for upcoming refuse burns at Canada Cement LaFarge and the Lakeview Generating Station.

In 1977-78, the Section witnessed/evaluated 67 source tests conducted across the Province. Source tests for malodorous emissions from restaurants and automobile painting operations were also conducted, and source surveys were co-ordinated or carried out for toluene diisocyanate, PCBs, PAHs, and emissions from the INCO superstack in Sudbury.

Vehicle Emissions Section

In 1977-78, this Section performed 4,653 inspections at its Castlefield Avenue Test Centre. Of these, 166 (3.6 per cent) inspections turned up disconnected or missing pollution control equipment. Elsewhere in Toronto, 3,980 inspections at 11 sites resulted in 233 defective vehicles (5.9 per cent) being found. Test staff also visited 13 municipalities during the summer of 1977 and tested 2,755 vehicles of which 133 (4.8 per cent) had defective pollution control equipment. Visits to Sault Ste. Marie and Kenora were made to participate in "Conservation Week" activities.

As a result of the testing program, the Ministry brought 41 charges against vehicle owners. Of this number, 34 cases resulted in guilty verdicts; four cases

were dismissed; three cases were still pending at year-end.

Inspectors visited 207 automotive dealerships to inspect on-sale cars for compliance with Section 23 of The Environmental Protection Act. Altogether, 1,231 cars were checked and 138 Violation Notices issued. It was only necessary to charge four dealerships for failure to comply with the Notices.

The Section's two diesel inspectors, working with Ontario Provincial Police (OPP) patrols, stopped 510 trucks because of smoke emissions. As a result, 159 warnings were issued and 351 charges were processed by the OPP under Section 49(2) of The Highway Traffic Act. Of this number, 256 cases resulted in guilty verdicts; 19 cases were dismissed; 76 cases were still pending at year-end.

Inspectors made 24 visits to community colleges and schools to explain the provisions of The Environmental Protection Act, the operation of the Vehicle Emissions Section, and how the Ministry's legislation affects the work of motor vehicle mechanics.

water resources branch

Director: G.H. Mills

The Water Resources Branch collects and interprets information on water resources and provides water management, engineering, and scientific services to municipalities, consultants, conservation authorities, and other ministries. Activities directed toward the detection and prevention of contamination of lakes, streams, and ground-

water, and the dissemination of information on trace contaminants in fish, strengthen the Ministry's role in safeguarding water resources for multiple uses.

Great Lakes

As part of the review of the Canada-United States Agreement on Great Lakes Water Quality, major issues considered were water quality objectives; surveillance and control of hazardous substances; pollution from shipping, dredging, point sources and land use activities; and public perception of Great Lakes water quality.

The Ministry and the federal government recognize the importance of a strong surveillance program to monitor the clean-up of the Great Lakes. In the Canada-Ontario Agreement, the federal government has agreed to pay a maximum of \$762,500 in matching funds to the Province to assist in the surveillance of the Great Lakes.

Studies completed in Thunder Bay in 1977 indicate a greater extent of bacterial contamination and oxygen depletion than previously observed. An evaluation of total phosphorus trends between 1970 and 1977 shows the amount of phosphorus in the nearshore zone not to have increased significantly over this period.

Preliminary findings of 1977 studies in the St. Mary's River indicate water quality conditions in the river to be similar to those determined in previous years. Improvements in river water quality are anticipated in 1978 because of major abatement measures implemented at the end of 1977.

Data from a short-term survey of Batchawana Bay on Lake Superior during 1977 did not substantiate earlier findings of bacterial contamination and nutrient enrichment. Bacterial levels are well within Ministry criteria for recreational uses.

Radium 226 levels above the MOE drinking water criterion of 3 pCi/l still persisted in 1977 in the inner portion of Serpent Harbour. Two surveys in 1977 indicated acidification problems in the inner harbour up to four km from the river mouth.

Phosphorus data for Collingwood Harbour in 1977 indicate the harbour is still over-enriched.

During 1977, the Branch undertook special testing to increase the analytical sensitivity of the measurement technique for hydrogen sulphide in the site for Bruce Nuclear Power development. Large volume samples and on-site analysis of water adjacent to the combined cooling water discharges at Douglas Point Generating Station and Bruce 'A' heavy water plant did not indicate the presence of hydrogen sulphide to a detection limit of approximately 2 to 5 ug/l.

Water quality investigations carried out in the St. Clair River indicated a downward trend in mercury levels in fish and sediment over the seven-year period 1970-76. The mercury content in Lake St. Clair fish is now one-half of what it was in 1970. This dramatic decline is attributed to the reduction of industrial mercury discharges as a result of ministerial control orders and the translocation of mercury from the St. Clair River system to Lake Erie. Water quality investigations in the Detroit River revealed reductions of bacterial levels along the Ontario shoreline of the river.

Some improvements have been noted in recent years in the Canadian coastal waters of Lake Erie. In the western basin, total phosphorus levels have declined; phytoplankton biomass has decreased at the Kingsville intake monitoring site; chlorophyll *a* levels appear to have declined. In the eastern basin, there appears to be no significant change in water quality with time. The water quality at the Grand River mouth is still degraded as a result of tributary nutrient and dissolved solids loadings.

A detailed evaluation of mercury levels in fish and sediment in the western basin of Lake Erie has been completed. This assessment concluded that mercury levels in walleye and white bass in the western basin of Lake Erie have declined significantly since controls on industrial mercury losses were implemented in 1970. Mean concentrations of mercury in the western basin sediments have not appreciably decreased; however, some redistribution of more heavily laden sediments has occurred.

Since 1969, water quality in the nearshore area of Lake Erie at Nanticoke has been under surveillance. The surveys provide background data for the region where considerable industrial development is under way. Analysis of data acquired so far shows that only minor long-term changes can be detected for several of the parameters. The water quality is similar throughout the area, with seasonal changes occurring each year.

Water quality surveys covering the effects of artificial mixing by aeration in Hamilton Harbour showed the smallest temperature-gradient-with-depth yet recorded during three years of artificial mixing. Dissolved oxygen again improved in deeper harbour waters and remained normal in surface waters. However, spring ammonia concentrations were higher than in 1976; and total phosphorus was higher in the northeast corner of the harbour. Sources and sinks of oxygen were studied. Sediments utilized 13-23 per cent of the total oxygen supplied to the harbour. Important sources of oxygen are atmospheric re-aeration (68-84 per cent) and lake-harbour exchange which supplies about 20 per cent of oxygen during the critical summer period. It was found that both sediment oxygen demand and water column oxygen demand rise with increasing temperature and dissolved oxygen concentration. It was apparent that artificial mixing increased the rates at which wastes became stabilized.

Bacteriological trends for Toronto beaches were updated in 1977. Liaison, information exchange, and

comment with regard to local municipal planning activities are carried out on an ongoing basis. High nutrient loading, poor bacteriological water quality and sediment contamination continue to be the major issues in Toronto Harbour.

Recording meter data, representing major waste inputs and water exchanges with Lake Ontario, were applied directly to the numerical model of currents and water quality at ten-minute intervals. The model output was verified by comparison with recording meter data from an independent location and showed circulation patterns and movement of dissolved compounds varied with wind directions and storm events. Major inflow to the harbour is through the western gap; outflows are mainly through the Hearn generating station and the eastern gap.

Low dissolved oxygen levels in the Bay of Quinte and Adolphus Reach area continue to be a problem. Phosphorus levels continue to be high in the Bay of Quinte, particularly in the upper bay.

Pollution From Land Use Activities Reference Group (PLUARG)

Input to the Pollution from Land Use Activities Reference Group (PLUARG) study under the International Joint Commission was completed. Principal findings of Ministry studies in the Grand River and Saugeen River "pilot watersheds" are contained in two summary reports submitted to PLUARG.

Major sources of pollutant loadings are as follows:

Urban

- metals, organic chemicals, bacteria, phosphorus

Point-sources

- metals, organic chemicals, phosphorus, nitrogen

Transportation - lead, chloride

Private-waste Disposal - phosphorus

Agriculture - sediment, phosphorus, nitrogen

Pollutant rankings suggest that urban runoff, relative to drainage from agriculture and wooded land, yields greater unit-area loads of total phosphorus, sediment, chloride, and metals. The rankings also suggest that agricultural runoff compared to urban and wooded areas is the major contributor of nitrogen and filtered reactive phosphate in both pilot watersheds.

In addition to significant inputs of phosphorus from agricultural activities and private-waste disposal systems, increased levels of nitrogen creating localized ground-water problems may also occur as a result of these land uses and practices in the basin. Properly constructed private-waste disposal systems are of minor concern.

Highway de-icing agents are identified as being the major contributor of the chloride at the mouths of the Grand River and Saugeen River. The chloride load due to de-icing agents is estimated to be in the order of 40 to 60 per cent of the total load at the mouths.

Minimal impacts on stream water quality have been monitored from waste disposal practices such as sanitary landfills, processed organic waste disposal, and spray irrigation. This is, in part, due to the limited areal extent of these land uses and practices in the "pilot watersheds". Increased land usage of these practices could create an ultimate environmental concern if proper design and management of the sites are not observed. Generally, the major concern is with respect to possible contamination of ground-water by pollutants such as

nitrate, phenoloc compounds, industrial chemicals, pesticides, and other chemicals that may be present in the waste.

Monitoring data suggest that the mining of aggregates for the construction industry (sand, gravel, crushed stone, lime, etc.) does not affect receiving stream water quality provided some method of wastewater treatment such as settling ponds is used.

The results indicate that the bulk of the river loads (from 80 to 95 per cent in the Grand and Saugeen rivers, respectively) are transported during the months of February, March, April, and May. Heavy metals, pesticides, and organic chemicals have a strong affinity for the clay-size sediment fraction which is transported as suspended material in the water.

In order to assess the impact of watershed loadings of contaminants on the biota, body-burden levels for fish, benthos, plankton, and water were determined at selected sites on Lakes St. Clair, Erie, Ontario, and Georgian Bay. Contaminant partitioning in various components of the stream and biota were observed at Grand River and Oakville Creek in 1976 by utilizing samples of emerald shiners, amphipods, plankton, and river water. While river water concentrations of contaminants were similar at both sites, significantly higher organochlorine contaminant levels were found in the biota from the Oakville Creek delta.

Aquatic Weeds

The Branch published two reports summarizing the results of research and feasibility studies on aquatic weed harvesting completed in 1976-77. In 1977-78, aquatic plant harvesting was continued in the Kawartha Lakes under Ministry supervision, and 860 acres were harvested.

Some 50 lakes were surveyed across Ontario to define the extent of invasion of problem weed species (Eurasian Watermilfoil) and to establish environmental factors controlling their distribution. Surveys were carried out throughout the Trent System and in part of the Rideau System.

Sudbury Environmental Study

With the aid of in-situ rainbow trout bioassays, it was shown that the heavy metals in Middle and Lohi Lakes remained at concentrations toxic to fish even after the pH had been brought back to normal. Fertilization experiments were continued to improve understanding of metal-acid-nutrient-biota interactions within Middle Lake near Sudbury.

Alkalinity in "reclaimed" lakes has been slowly dropping, and at least one lake became acidic again. Intensive surveys continued to define inputs from runoff and the atmosphere to explain the loss of alkalinity. Long-term monitoring of acidified and metal-contaminated Clearwater Lake was continued.

Lakeshore Capacity Study

The Lakeshore Capacity Study is a co-operative venture sponsored by the Ministry of Housing and involving the Ministry of the Environment and the Ministry of Natural Resources.

At year-end the Study was midway through the field work designed to quantify the effects of cottage development on lake water quality. The study is providing much of the relevant acidic precipitation data in Ontario. Atmospheric ion-loadings to the lakes have been calculated in addition to the loss of phosphorus and nitrogen from them. Both parameters are required for the construction of lake mass balance budgets and models to quantify the effects of man's activities.

Urban Area Lakes

Gravenhurst Bay continued to show improvement in water quality; both total phosphorus and total nitrogen were lower in 1977. Secchi disc depths were slightly higher than those observed in 1975.

Branch staff completed the first year of a study of two man-made lakes fed strictly by stormwater runoff. The lakes -- Aquitaine and Wabukayne -- are located in Mississauga. The larger lake, Aquataine, has a more sophisticated sedimentation pond which proved very effective. Extremely clear water prevailed in the late summer with Secchi disc depths as deep as 3.5 m. The developer added 3,300 rainbow trout to Lake Aquataine in late September.

Water quality in the area of Midland and Penetanguishene on Georgian Bay has not shown the improvement expected. In Penetang Bay, water quality results were similar to those obtained in 1974.

Destratification efforts were continued in Heart Lake. Although a massive algal bloom developed during the summer months, as usual, it was not of the same species as in 1976, and no fish kill occurred.

Trace Contaminants

As this Province's "spokesman" for trace contaminants such as mercury, polychlorinated biphenyl, mirex, and DDT, the Ministry of the Environment issued 12 bulletins on contaminants in fish for about 200 watercourses throughout Ontario. The Environmental Health Bulletins are based on fish samples collected primarily by staff of the Ministry of Natural Resources and analyzed by the MOE laboratory. Medical advice is provided by staff of the Ministry of Labour. Water Resources Branch staff evaluate the laboratory results, prepare the basic environmental health bulletins, and co-ordinate trace contami-

nants information distribution. In addition, Branch staff co-ordinate the planning of the yearly fish monitoring program and participate in the planning and, in some cases, the implementation of special studies.

The Branch initiated the Lake Simcoe mercury study early in 1977 to identify possible sources of mercury and their magnitude and significance in light of elevated mercury levels measured in large walleye (pickerel) taken from the lake. Field work was completed in the winter of 1977-78, and a final report was scheduled for the spring of 1978.

Branch staff also began an environmental study of the significance and impact of mercury used on golf courses. Field studies were conducted in the late fall at two golf courses that use mercurial compounds to control fungi (snow mould). Similar studies were to be carried out during the spring runoff period and a report prepared.

A special fish monitoring program, involving young-of-the-year minnows (spottail shiner) in nearshore areas of the Great Lakes and yearling perch in inland watercourses, continued during 1977-78. The program has proven valuable in determining and evaluating contamination in localized areas by chlorinated hydrocarbon compounds (PCBs, pesticides, etc.). Information was obtained for 25 locations on the Great Lakes and 13 locations on inland lakes.

Branch staff participated on the Inter-ministerial Committee on Mercury. This Committee developed comprehensive publications to guide anglers on safe consumption levels for various species of fish from lakes throughout Ontario. The information packages were published in July 1977. Updated publications will be prepared each year to incorporate new results. The 1978 version was scheduled for release at the end of April 1978.

Water Management

The Branch completed extensive review and revision on the publication "Guidelines and Criteria for Water Quality Management in Ontario". The revisions include: a broadening of the scope of the document to cover surface and ground-water quality and quantity management; the establishment of statements of goals, policies, and implementation procedures for each of these four areas; and an updating of the receiving water criteria. The proposed revisions were distributed for review and approval.

The Permit To Take Water Program, administered under Section 37 of The Ontario Water Resources Act was reviewed and updated to provide a better and more efficient service to the public. The development of an automated storage and retrieval system for water-taking information marks a significant step forward in handling large volumes of permit data rapidly and efficiently. The system was tested on a pilot basis during 1977 and planning the implementation of the Water Taking Information System on a Province-wide basis will be undertaken in 1978.

Surveillance of the water-well drilling industry continued with the issuing of 484 licenses to drilling and boring contractors during 1977, with 32 of these being to contractors licensed for the first time. Three drillers were prosecuted during 1977, one license was cancelled and one license placed in temporary suspension for infractions under Section 40 of The Ontario Water Resources Act. Several training seminars were arranged and presented to regional staff from this Ministry and the Ministry of Health as part of a continuing upgrading program for drilling industry surveillance. A two-day water-well drilling conference was sponsored at our Toronto laboratory with special emphasis placed on driller training, certification, and drilling safety. A total of 121 attended this conference; an increase of 20 per cent over attendance at the last conference in 1975.

Water Resources Inventories

The water resources study of the South Nation River basin was completed. Results of the South Nation River basin study indicate that the water resources of this basin are major limiting factors to development. An inter-ministerial proposal for water-resources management in the South Nation River basin has been put forward by the Ministry of the Environment, the Ministry of Natural Resources, and the Ministry of Agriculture and Food.

The ground-water mapping projects, historically involving only probability maps on a county basis, were expanded in 1976 to include: (1) the mapping of flowing wells in the Province and (2) the delineation of major aquifers that may provide significant water-supply potentials. The ground-water probability maps are layman-oriented and are designed primarily for domestic users who require small quantities of water. The ground-water probability map for the County of Brant was published and mapping was completed for the regional municipalities of Peel and Haldimand-Norfolk. Mapping is in progress for the County of Simcoe. The mapping of flowing wells is designed to aid in the conservation of ground-water by requiring that water-well drillers take precautionary measures in such areas to control flows. Mapping was completed this year for the southern part of the Province and the results have been made available primarily to water-well drillers. Maps for the rest of the Province will be completed and released in 1978. In the major aquifer series, which identifies and delineates major sources of ground-water for large-scale development needs in the Province, the Alliston Aquifer Complex map was published. Mapping was completed for the Oak Ridge Aquifer Complex and the Guelph-Amabel Aquifer which extends from the Niagara Peninsula to the Owen Sound area.

Three publications, "Water Well Records for Ontario", Bulletins 2-18, 2-19, and 2-20, were released, showing

ground-water and geologic data covering eight counties in Southern Ontario. Bulletin 2-101, "Data for Observation Wells in Ontario, 1974", which presents data on ground-water levels in the Province of Ontario, was released. Four publications, providing basic information on the Province's streamflow and inland water quality, were released: "Selected Streamflow Data, Ontario, - Bulletin 3-11, 1976", "Lowflow Characteristics of Streams in Southeastern Ontario, - Map 3005-3", and "Water Quality Data for Ontario Lakes and Streams, - Volume IX, 1974 and Volume X, 1975".

The Branch prepared a summary of 1976-77 pesticides and metals data for all significant streams tributary to the Canadian side of the Lower Great Lakes in support of Task 'D' activities under the PLUARG study. Total phosphorus tributary loading information was provided to the International Joint Commission (IJC) for all significant tributaries to the Great Lakes for the period 1967-74, as well as the 1976-77 data. Detroit River tributary loads for the period 1976-77 were provided to the Michigan Department of Natural Resources as input to the Surveillance Subcommittee Report on the Detroit River.

Grand River Basin Water Management Study

The Branch continued water resources survey activities in the Grand River during 1977-78. This was the third year of intensive investigations of the environmental impact of sewage treatment plants. During the summer of 1977, surveys downstream from six sewage treatment plants on the Nith River, Canagagigue Creek, and the Upper Grand River were completed. These studies, along with investigations of the larger sewage treatment plants in the central and lower basin in former years, complete this component of the Grand River study.

Robot or automated monitoring stations, in conjunction with routine year-round sampling, measured and recorded water quality at key locations throughout the basin. Biological field work was carried out at selected reaches of the river as part of the ongoing study of the relationship between nutrient input, biomass production, and daily dissolved oxygen fluctuations. Hydrologic studies, conducted in conjunction with the Ministry of Natural Resources and the Grand River Conservation Authority, continued with the evaluation, implementation, and testing of computer models for streamflow generation and reservoir operation.

During the summer of 1977, plans were approved and funding provided for a much more extensive study of water resource management of the Grand River basin to be completed by September 1980. During the late fall and winter months, new and expanded programs were developed and scientists, engineers, and technicians were engaged to implement the programs. The ground-water inventory study was initiated. Urban runoff models were applied to areas in the City of Guelph and tested for future use in determining the effects of urban stormwater runoff in the basin. In March 1978, a full-time study co-ordinator was hired.

The broad objective of the study is to develop a multi-use waste management plan for the basin involving consideration of all beneficial water uses; protection of water quality; maintenance of water supply, recreational uses, and flood protection. The Grand River Implementation Committee is directing the study. The Committee is composed of representatives from several ministries (Natural Resources, Housing, TEIGA, Agriculture and Food, Environment) and the Grand River Conservation Authority. A member of the Water Resources Branch chairs the Committee.

Cartography and Drafting Services

Cartographic, drafting, graphic design, and reproduction services were provided in support of Ministry programs. Requests for such services increased by 16 per cent over the previous year. Staff completed 330 multi-color and monocolour maps and produced 1,540 technical drawings, graphic artworks, and illustrations.

Engineering and Scientific Services

Work toward reducing the incidents of ground-water contamination in Ontario continued in the area of solid waste disposal, salt contamination, and underground petroleum storage. Staff input was provided in developing the Ministry's position on a number of disposal sites including those proposed at Maple, Brock Road North, and Ottawa-Carleton, and the proposed disposal facility for nuclear wastes at Port Granby. A problem with landfill gas at the Kitchener-Waterloo landfill was addressed at the request of the district office, and expert testimony was provided for the Ministry at the Environmental Assessment Board's hearings on the proposed industrial-waste disposal facility at Nanticoke. Consultation was continued with the Ministry's Committee on Amendments to the Regulations re Waste Management. Membership on the MTC-MOE Contamination Committee continued, and assistance was provided to the regions and the Ministry of Transportation and Communications in resolving particularly difficult ground-water contamination problems associated with storage facilities for de-icing materials.

The Branch is represented on the ad-hoc Committee on Leaks and Spills of Petroleum Products which was formalized in 1977. The most recent efforts of this Committee have been directed toward establishing a co-ordinated approach to field investigations of contamination incidents by staff of the Ministries of Consumer and Commercial Relations and Environment.

The soils laboratory continued to conduct a variety of analyses on soil samples submitted from various sources within the Ministry, in support of the PLUARG study, drainage basin inventory studies, ground-water development projects, and studies undertaken as part of the regional approvals function for sanitary landfill sites.

Geophysical surveys involving seismic, resistivity, well-logging, and VLF (very low frequency) resistivity methods were utilized in ground-water contamination problems. Specialized assistance was also provided to the Ministry of Transportation and Communications and the University of Waterloo.

Field studies continued for a second year on the extent and significance of residual chlorine levels in streams, and a paper summarizing the study findings was presented at a chlorination conference.

Staff specialists with expertise in evaluating the aquatic environmental impacts of marine construction, hydro projects, and radioactive pollutants provided technical assistance to MOE regional and head office staff as well as other ministries and agencies. Projects involving such staff included: major landfills along the Lake Ontario shoreline; Ontario Hydro's proposed Darlington and Atikokan Generating Stations; radon contamination in basements and deep wells.

Phytoplankton and zooplankton analyses supported a wide variety of regional programs. Over 100 written reports were sent out in answer to specific questions or problems, and data were collected from 135 lakes in co-operation with regional staff.

Three Ministry reports and four journal papers were published which summarized findings relative to Ontario's phosphorus control program, aspects of phytoplankton methodology, and descriptions of new species.

Industrial effluents are tested for acute toxicity to fish in support of abatement programs. Approximately 77 industries were tested in 1977-78. These data are forwarded also to Environment Canada. The 1978-79 effort is to concentrate on the steel industry. A Branch member serves on the Technical Co-ordinating Committee in order to participate in federal test standardization and development of future regulatory requirements.

Sublethal tests, such as tainting of fish flesh, were also carried out in support of abatement measures. Most of this effort dealt with industries in the Sarnia area. The most prevalent chemicals identified during this study are to be examined to determine their bio-accumulative potential.

The Branch assisted regional staff in conducting intensive surveys to define the effect of waste effluent discharges on stream quality and applying water quality models to set effluent waste loading guidelines for pulp and paper mills and mining process operations in the northeastern and northwestern regions. Similar tasks were undertaken for the southern regions in defining discharge guidelines for proposed changes or additions to existing sewage treatment plant facilities, and in applying Ministry guidelines and criteria for stormwater management in new urban development areas. The second Annual Seminar on Water Resources Assessment was held to discuss such problems with regional staff.

The Branch advised Legal Services and regional offices on the dispersion and movement of contaminants in Lake Erie in connection with a proposed industrial-waste disposal facility and a proposed industrial outfall at Nanticoke. Staff served as consultants to UNESCO on the Tejo Estuary Water Quality Study in Portugal and in developing a manual on self-purification processes in lakes.

Participation in the activities of the Urban Drainage Subcommittee under the Canada-Ontario Agreement continued. Supervision of external data collection and design projects was completed to demonstrate the use of stormwater management models in defining pollution loadings from separate and combined sewer overflows. Active roles were also provided in the development of the Urban Drainage Practice Manual and the Manual of Urban Stormwater Management policies.

pollution control branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations, and guidelines to control the emission of contaminants. Supplementary functions include applied research, technology transfer, technical advisory service, and delivery of certain aspects of the pesticides and noise control programs.

During the year, the training and certification and safety programs were transferred to the Branch.

Municipal and Private Section

This Section is responsible for policy development and program audit in connection with municipal water supply and pollution control, private sewage, and solid waste management systems.

Municipal Water Unit

The Municipal Water Unit developed and circulated a draft policy and guidelines relating to the location of sewers and watermains to 60 municipalities for comment prior to finalization. Major support was provided in the preparation of a manual on cross-connection control. These documents are intended to guide municipalities in the installation of sewers and watermains and to minimize the potential for contamination of water systems.

Revisions to the Chlorination Bulletin were still in progress at year-end. A questionnaire on disinfection practices prepared jointly by the Ministry and the Ontario Section of the American Water Works Association was distributed for comment and the Unit was collating the data prior to preparation of a report.

The Unit continues to serve on the MOE/Ministry of Health Committee on household water treatment devices. A guideline on ultra-violet disinfection was completed and a draft guideline for iodine disinfection prepared for discussion.

Municipal Sewage Unit

The Municipal Sewage Unit completed draft guidelines for the inspection of digester gas systems in existing sewage treatment plants to ensure their safe operation. A complete listing of all water and sewage works in Ontario was issued and is to be updated annually. The annual "Operating Summaries" for 1976 covering Ministry-operated water and sewage facilities were published. Policies and guidelines on "Energy Conservation in Sewage Treatment", "Land Application of Sewage Plant Effluents", and "Disinfection of Wastewater" were in preparation at year-end.

Under the Municipal Infrastructure Agreement between Central Mortgage and Housing Corporation and the Ministry of the Environment, a five-year (1977-1981) Province-wide capital budget forecast for water and sewage facilities was produced. Based on the forecast, Central Mortgage & Housing Corporation financing for sewage and water works construction in Ontario for 1977 was negotiated to be \$106.9 million in loans, \$13.5 million in grants, and \$7.6 million in high-cost construction grants. However, due to financial constraints exercised by the federal government, the loan commitments were subsequently cut back to \$92.3 million.

During the year, 11 new sewage treatment plants and nine new water treatment plants were put into service. A total of 343 sewage works were in operation in Ontario at year-end with a total design capacity of 1.1 billion Imperial gallons per day. In addition, 467 water works were operating in the Province at year-end with a total design capacity of 2 billion Imperial gallons per day.

Under the International Joint Commission on Great Lakes Water Quality, the Municipal Sewage Unit is also responsible for administering and co-ordinating the Ministry's activities pertaining to research and program implementation under the Canada-Ontario Agreement (COA) with the exception of the surveillance program. One of the more significant programs under COA has been provision for phosphorus removal at all significant municipal discharges. This program was completed in 1976-77. At year-end, over 210 sewage treatment plants, representing 85 per cent of the total hydraulic capacity of all sewage plants in the Province, were undertaking phosphorus removal.

The Unit concentrated considerable effort on urban drainage management and sewage sludge utilization on agricultural lands. A manual of "Urban Drainage Practices" was prepared by an Inter-Governmental Working

Committee outlining the ramifications and practices of innovative urban drainage concepts and providing methodologies for their adoption and implementation. A draft policy and guidelines package on urban drainage management was under development at year-end. Draft guidelines for the utilization of sewage sludge on agricultural lands were finalized by an Inter-ministerial Committee representing the Ministries of Agriculture and Food, Environment, and Health.

The Unit co-ordinates the development and operation of a Management Information System. In conjunction with the Systems Development Section of the Administrative Services Branch, work was completed on the development and testing of the Utility Water Pollution Monitoring File which can store and accumulate water and sewage treatment plant operating data and produce comprehensive summaries on the performance efficiencies, loadings, costs, and capabilities of all municipal sewage and water treatment facilities. Input of data to the file was begun for Ministry-operated utilities; the file will ultimately be extended to cover all utilities across the Province.

Private Sewage Unit

The Private Sewage Unit prepared amendments to the sewage system regulations. In addition, Notices were issued to all regional municipalities, health units, and Ministry field offices on matters related to the program. The Notices provided policy statements on such varied subjects as land inspection, equipment acceptance, and financial arrangements with implementing agencies.

Solid Waste Unit*

The Solid Waste Unit co-ordinated the Derelict Motor Vehicle Clean-Up Program in 20 new municipalities in addition to the 16 carry-over contracts from 1976-77. These projects were mostly located in the northern

regions of Ontario. Revenue from the sale of vehicle hulks remained with the municipalities to further their clean-up efforts. During the year, 14,139 hulks were located, of which 11,630 were released by the owners, and 9,430 were delivered to certified derelict motor vehicle sites. The hulks are returned to steel mills through scrap metal dealers.

The Waste Management Improvement Program, under Derelict Motor Vehicle funding, was initiated in the spring of 1977. Contracts were entered into with 143 municipalities throughout Ontario whereby funds were provided for:

- (1) upgrading existing landfills to meet MOE standards;
- (2) properly closing waste disposal sites;
- (3) the development of new waste disposal sites;
- (4) debris clean-up of recreational areas.

The contracts were basically labor-oriented and required 60 per cent of total costs to be applied to job creation.

In March 1978, Regulation 687/76 was amended by Regulation 157/78 to complete the Province's control program on non-refillable beverage containers. This permits the continued use of non-refillable glass containers in 200 ml, 750 ml, and 1.5 litre sizes. The display space for refillables and non-refillables is specified in order to ensure at least equal area for refillable containers. The promised voluntary co-operation by industry to achieve 75 per cent refillable container use by December 31, 1979, will achieve the same environmental goals as established in the original program approach.

A review of Regulation 824 is being carried out in order to streamline the approval process, improve the operation and control of landfill sites, and provide more

flexibility in waste management decisions.

The Pathological Waste Implementation Task Force was established to develop an economically-viable and environmentally-sound plan for managing pathological waste in the Province. The Task Force was, at year-end, developing guidelines for the collection, storage, transportation, and disposal of these wastes.

Industrial Section*

This Section continued to develop guidelines and technical reports for pollution control in the industrial sector and provide technical support to the Ministry's regional operations.

All existing mining guidelines were reviewed, revised, and incorporated into a single document entitled, "Guidelines for Environmental Control in the Ontario Mineral Industry". The guidelines were extended to include control levels for ammonia, cyanide, arsenic, and phosphorus.

Work was completed on a status report entitled, "Active Mining Operations in The Province of Ontario". The report is to be published in 1978-79.

The experimental solidification plant for the treatment of liquid industrial wastes established at the Ottawa Street landfill site in Hamilton operated successfully during 1977-78. Data gathered from the operation should enable the company to apply for formal approval to operate the process at a permanent location.

The new way-bill regulation (Ontario Regulation 926/76) functioned reasonably well during the year, and much useful information was obtained from the returns. A number of automated systems for mechanical handling of the data extracted from the returns were investigated, and a system was selected which should considerably

improve the efficiency of data-handling and the control function of the Regulation. Revisions to the reporting forms were undertaken to make them more compatible with the automated data handling system.

Funding was received in 1977-78 from the Provincial Lottery Corporation for a project involving the rehabilitation of derelict mining lands across Ontario.

During the year, 642 inactive and abandoned mining properties in Ontario were documented, of which 160 were visited. During this period, 110 mineral tailings samples were taken and analyzed for 33 parameters while an associated 177 vegetation samples were analyzed for 21 parameters. All data is to be presented in a report to be published in 1978-79.

The Section continued co-ordination of the general PCB pollution abatement program. The destruction of PCBs at St. Lawrence Cement was subject to review at a public meeting in Mississauga, and this issue is to be presented for consideration by the Environmental Assessment Board in 1978-79.

The Section commenced a Provincial Lottery-funded project to assess the environmental impact of using waste oil as a dust suppressant on rural roads. Phase I of the study was completed by year-end; Phase II is to be continued in 1978-79.

Guidelines respecting environmental emergency procedures, pollution prevention measures at chemical storage facilities, and PCB pollution prevention and waste management were initiated in 1977-78 and are expected to be issued in 1978-79.

Phase II of a Consultant's study on the potential utilization of wood wastes in the Hearst Area was completed. This phase was a detailed financial and engineering evaluation of the feasibility of constructing an

energy complex generating steam and electricity. The final report is expected in mid-1978.

An Inter-ministerial Committee, established to find solutions to the whey disposal problem at small cheese factories in Eastern Ontario, was unsuccessful in attracting any interest on the part of the private sector to build a central whey-drying facility. Several alternatives, specific to individual small cheese plants, were being reviewed at year-end to determine whether such solutions to the whey disposal problem are feasible.

Noise Pollution Control Section

This Section received 368 new noise complaints in 1977-78 while the City of Toronto received 778 noise complaints.

Five municipalities adopted noise control bylaws which, pursuant to the legislation, were approved by the Minister of the Environment. Of these, the bylaws of North Bay, Barrie, and Guelph were printed for general distribution and information.

The third year of the Environmental Acoustics Technology training program was completed. More than 100 candidates received instruction in noise control and in noise abatement techniques in land use planning. Four of the Ministry training manuals in the series were revised and reprinted to meet public demand.

The Noise Pollution Control Section provided technical analysis and comment on 410 new land use projects including new subdivisions and changes in official plans. It also analyzed potential noise impacts on 40 new industrial projects submitted to the Ministry for approval.

A railway noise symposium co-sponsored by CP Rail and the Ministry was held in Toronto in May 1977 to discuss environmental and land use problems arising from

noisy railway activities. Many federal and provincial agencies concerned with the issue attended and contributed to the symposium. A comprehensive report on the symposium and background documents was later circulated to all participants.

Two noise-related projects were funded by the Ministry under the Experience '77 program, and considerable data was gathered by students working under professional supervision. In addition, work continued on four major in-house projects related to aircraft noise, freeway noise, impulsive noise, and truck noise. A number of interim reports were prepared for distribution and comment.

Pesticides Control Section

This Section promotes a balance between pesticide use and environmental protection. Its prime responsibility is to ensure the safe use and management of pesticides in Ontario through licensing of exterminators and vendors, issuances of permits for use, public education programs, and industrial and commercial education with training courses, fact sheets, and study guides.

The Section carries out its programs under The Pesticides Act, 1973 and Ontario Regulation 618/74.

Mosquito Control Program

The summer of 1977 was the second consecutive one in which municipalities south of a line drawn between Sarnia and Toronto were urged to participate in mosquito abatement programs. This part of the Province was designated a high-risk area after 67 cases of St. Louis encephalitis were reported during the fall of 1975.

The Section continued its mosquito identification service to determine where different breeds were located and when larvicides should be applied to the water. In addition, 50 mosquito light traps were placed throughout

the southern portion of the Province to determine the activity and abundance of the potentially-hazardous species.

Due mainly to dry weather, mosquito populations were reduced during 1977-78. Fortunately, there were no human cases of encephalitis during this time.

Termite Control Program

This program is directed toward providing technical and financial assistance to municipalities experiencing problems with termites. Public education is a big part of the program.

Surveys were being carried out at year-end in all boroughs of Metro Toronto as well as ten other communities in the Province. The Section conducted a termite survey using wooden bait blocks. Last year, 12,000 of these blocks were examined, and various degrees of activity found. The blocks were found to be good indicators of whether or not termites were infesting an immediate area.

Following is a list of termite control grants

<u>Municipalities</u>	<u>Chemical</u>	<u>Structural</u>
Township of Gosfield South	1,740.00	-
Town of Kincardine	23,089.20	4,640.25
Town of Leamington	15,777.00	-
Village of Elora	4,476.40	180.00
City of Guelph	204.00	1,796.00
Borough of East York	9,328.80	3,914.00
Town of Markham	225.00	-
Borough of Scarborough	5,809.92	2,396.00
City of Toronto	32,607.18	21,352.17
Sub-Totals	93,257.50	34,278.42
Total	\$127,535.92	

Grants in the amount of \$127,535 were approved. Two hundred and fifty-three treatments were successfully completed. Homeowner grants amounted to \$105,287.

Licensing

Licensing involves providing appropriate study material, examining applicants, and licensing qualified applicants to apply, store, or sell pesticides. The Section is also involved with the licensing of termite and mosquito exterminators.

During 1977-78, the Section gave 1,600 examinations and issued approximately 5,300 exterminator, 800 operator, and 3,500 vendor licenses. Also issued were 138 permits for the use of restricted products on land, 459 permits for the application of pesticides to water, and 194 permits for structural extermination.

Research

The Section conducted research in selected water sites throughout the Province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

Contingency Planning Section

The "Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials" and one publication supplementing this manual were revised and updated. The contingency plan organizes the activities of the various governmental agencies which may be involved in a spill incident of major proportions. Agreement in principle was reached to have the Ministry of Labour co-sign the Provincial Plan, bringing the total number of participating agencies to nine.

The Section continued to assist in the development of several contingency plans for municipalities and major

corporations. The Section also continued to assist in the development of the "Detroit-St. Clair River Supplement", a detailed response mechanism under the Joint Canada-U.S. Marine Contingency Plan.

The Section participated in several training exercises, seminars, and workshops; of particular interest was a "hands-on" oil spill exercise on the St. Clair River organized by the Canadian Coast Guard. The exercise was centred around a simulated spill of bunker oil from an imaginary oil storage facility in Sarnia and involved the escalating response of industry, municipal, provincial, and federal resources. More than 210 people participated. The Section also helped to prepare a similar exercise held at Parry Sound and one to be held at Thunder Bay in 1978-79.

The Section prepared design criteria for the construction of a retention pond in the City of Peterborough, incorporating facilities to minimize adverse effects of possible oil spills. The retention pond, now in operation, is intended to intercept possible oil spills from a developing industrial sector up-stream from the City's water intake.

A paper entitled "Response to Spills in Ontario" was presented at the 1977 Water Pollution Control Federation Conference in Philadelphia.

Preliminary arrangements were made to include a lecture on the Ministry's spill prevention and response program in courses given by the Fire Marshal's Office at the Ontario Fire Fighters' College in Gravenhurst.

During 1977-78, the Section received spill reports on 527 incidents. Of these, 360 involved the loss of oil; 77, the loss of liquid or solid hazardous materials; 7, gaseous hazardous materials; 83, other contaminants. The average oil spill involved the loss of 1,120 gallons as compared to 910 gallons for 1976-77 and 1,200 gallons for 1975-76.

RESEARCH AND DEVELOPMENT GROUP

Co-ordination and Technology Transfer Section

This Section is primarily responsible for internal and external co-ordination and liaison in matters related to research and for administration of the research facility.

The supervisor is chairman of the Ministry's Research Advisory Committee and maintains liaison with other research groups in the Ontario Government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. Contact was maintained with the U.S. Environmental Protection Agency (EPA) including the drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section continued to participate in EPA research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Nine health-related environmental projects with a value of \$1.0 million were funded during the year. The projects covered a wide range of subjects including: virus in river water, environmental properties of PCB substitutes, and environmental effects of road oiling. Available funds will be increased to \$2.5 million for 1978-79.

Applied Sciences Section

This Section carries out engineering investigations of innovative and unusual concepts with a view to providing information upon which regulations, policies, procedures and/or guidelines may be based. The Section completed eight such studies in 1977-78 resulting in five reports, two papers, and three "Technical Notes". Eight studies were still active at year-end, primarily in the fields of private waste disposal, municipal utility

construction in cold climates, and energy conservation.

Wastewater Treatment Section

This Section advances the quality of wastewater treatment in Ontario by maintaining and upgrading the level of expertise in wastewater treatment technology through developmental research and by providing expert advice and assistance to planning, control, and operational staff of the Ministry, as well as to municipalities and private industry.

The Section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant at Brampton for use in developmental research work and operator training.

At year-end, the Section was involved in ten wastewater treatment research projects dealing with effluent disinfection, ammonia removal, physical/chemical treatment of stormwater, and digester mixing. During the year, four final reports, seven interim reports, and two technical bulletins were prepared. Eight technical papers were presented at conferences, workshops, and seminars.

In an advisory capacity, Section staff made 140 site visits to municipalities and operating treatment facilities after which 85 follow-up memoranda and reports were prepared. Section staff assisted in the preparation and/or review of design proposals for 15 facilities.

Section staff participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorination Workshop, the Digester and Primary Treatment Course, and a new Sampling and Monitoring Course as part of the Ministry's training program.

Water Technology Section

This Section conducted research with regard to

haloforms, ozone, iron, and manganese removal; distribution systems; and micro/macro-biological water quality.

Work on haloforms included an expanded Province-wide survey of haloforms found during water treatment plus a study of removal/reduction methods. A full-scale water plant project on reduced chloroform production was funded by Provincial Lottery money and was being carried out at the Belleville water treatment plant at year-end.

Because of the formation of chlorinated organics during chlorination water treatment, alternative disinfection procedures were investigated. A study of the use of ozone to treat colored water at the Smiths Falls water treatment plant included investigation of disinfection and by-products formation in addition to monitoring for haloforms when chlorine is applied after ozone treatment.

An asbestos monitoring program to cover all municipal water supplies was initiated. The start of the survey coincided with the implementation of standardized asbestos counting procedures and is to be correlated with treatment facilities at each specific plant. A paper was presented on this subject at the ACS annual meeting.

Technical advisory work continued with regard to the commissioning of new water plants, plant upgrading, and general plant operational and technical problems.

Safety Unit

The Safety Unit provides for the development and co-ordination of the Ministry's safety program.

A safety policy for the Ministry was produced, printed, and distributed. This document remains under ongoing review, particularly with regard to legislative changes.

A Safety Officers' Committee was formed with repre-

sentation from the six regions, the Laboratory Services Branch, and the Safety Unit to enforce the safety program within the Ministry.

Liaison and co-operation with other agencies was continued. Section staff sat on a committee formed by the Ministry of Consumer and Commercial Relations and the Canadian Gas Association to develop Regulation C.G.A.-B 105, "Handling of Digester Gas". Technical support was given to the Halifax Public Service Commission in the form of a safety lecture in its Chlorine Operators' Course. Upon request, staff made safety inspections at non-Ministry waterworks and sewage treatment plants across the Province, and gave lectures on safety to municipalities and industries.

Participation in Ministry training courses included three presentations on first aid, five on entry to confined spaces, and 14 for the Training Certification Section.

* Waste Management

As of August 1, 1978, the Solid Waste Unit and the Industrial Section of the Pollution Control Branch, as well as the Resource Recovery Branch of the Resources Division, were merged into the new Waste Management Branch. The new Branch is composed of two main sections: the Waste Utilization Section and the Waste Systems Planning Section.

The Waste Systems Planning Section will be primarily responsible for liquid and solid industrial waste. This responsibility will include the identification of industrial waste problems including the determination and evaluation of disposal options for this waste and the establishment of guidelines designed to prevent environmental damage from disposal.

The Waste Utilization Section will have similar responsibilities to the Waste Systems Planning Section but these will pertain to residential and commercial solid waste. The Province's resource recovery program will be the principal activity of this Section.

environmental approvals branch

Director: D.P. Caplice

The Environmental Approvals Branch offers a centralized approvals function for companies, individuals, and governmental agencies seeking project approvals under The Environmental Assessment Act and sections of The Ontario Water Resources Act and The Environmental Protection Act. Approval applications governed by The Ontario Water Resources Act and The Environmental Protection Act are screened by the Industrial Approvals Section and the Municipal and Private Approvals Section. The Environmental Assessment Section and the Land Use Co-ordination and Special Studies Section also comment on plans and policies suggested by other branches of the Ministry and other provincial and federal ministries and agencies.

The Environmental Assessment Section

This Section continued phased implementation of The Environmental Assessment Act to cover all major provincial, municipal, and private projects. The Act was proclaimed for provincial projects in 1976-77. Private industry remains exempt except on a case-by-case basis.

Section staff helped prepare Ministry policy and submissions on environmentally significant matters con-

cerning the nuclear power industry, involving the Royal Commission on Electric Power Planning, and the Royal Commission on the Northern Environment.

Section staff were involved in consultation on preparation of terms of reference for the Royal Commission on the Northern Environment (Hartt Commission) and the co-ordination of the Ministry's submission to the Commission. They also provided a continuing liaison between the Ministry and the Commission.

In 1977-78, the Ministry received the first group of formal environmental assessments including Class Environmental Assessments from the Ministry of Transportation and Communications for the widening of roads and the realignments of road right-of-ways, grades, and cross-sections. The Ministry of Government Services submitted an environmental assessment document on a proposed community agricultural college residence complex for Centralia. These environmental assessments were under review at year-end.

INCO requested that a hydro-electric project, which it proposed to construct on the Spanish River, be designated under the Environmental Assessment Act and, at year-end, was preparing an environmental assessment under Section-prepared guidelines.

Onakawana Development Limited requested that the Company's lignite mining project planned for the James Bay/Moosee area be placed under The Environmental Assessment Act. Data-gathering for the environmental assessment document was well under way at year-end.

Great Lakes Power Company Limited, the Ministry of Natural Resources, and individuals in Sault Ste. Marie requested that the proposed hydro-electric dam project on the St. Mary's River near the Sault Rapids be treated unofficially as an environmental assessment.

Major activities planned by Conservation Authorities in the Province were made subject to the requirements of The Environmental Assessment Act by regulation on September 1, 1977.

Section staff prepared and presented four major issue papers to the Porter Commission on electric power planning in the Province, and, at year-end, were writing the final document -- "Decision-Making in Electric Power Planning".

Section staff co-ordinated the provincial government's review of Environmental Impact documents submitted by Eldorado Nuclear Ltd. to the federal Environmental Assessment and Review Panel for the planned development of a uranium hexafluoride processing plant at Port Granby at Lake Ontario. Staff presented the provincial review and co-ordinated evidence presented before the federal Environmental Assessment Review Process (EARP) Hearings held in the fall of 1977 and winter of 1978 at Newcastle and Bowmanville. The EARP Hearing Panel found that the proposed plant site was unsatisfactory.

Section staff participated in the Environmental Assessment Board's hearings into expansion plans by Denison Mines and Rio Algom Mines for increased uranium mining output at Elliot Lake. Staff members prepared comments on the mining companies' proposals and presented evidence at the hearings. Staff also participated in discussions regarding radon gas contamination of proposed and existing housing in Elliot Lake.

Section staff reviewed water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act. The exempted projects were too far advanced to be properly assessed or too small to be of major environmental significance. Staff reviewed 108 projects and 45 contracts tendered under the York-Durham servicing scheme.

Section staff provided environmental advice to the Ontario Energy Corporation regarding its five per cent share in the Syncrude Alberta tar sands operation.

The Land Use Co-ordination & Special Studies Section

This Section advises other governmental agencies and the private sector on environmental matters related to land use planning. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans, and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use and on economic matters related to the environment in controlling pollution.

In 1977-78, the Section continued to participate, through inter-ministerial committees, in planning for Northwestern Ontario, the Parkway Belt, and the Niagara Escarpment. It also prepared and submitted materials for the Ministry's briefs to the Royal Commission on Electric Power Planning, co-ordinated the Ministry's response to the Report of the Planning Act Review Committee (Comay Report). The Section is represented on a federal-provincial committee considering solutions to the clean-up of radioactive waste. An econometric study of the pulp and paper industry was completed, and economic and financial analyses of several industries were carried out. In conjunction with the Resource Recovery Branch, the Section initiated a waste paper recycling program at the Ministry's head office. Several economic studies are under way on materials recovery and pollution abatement.

Industrial Approvals Section

This Section processes industrial applications for approval of treatment and control facilities, and provides technical expertise on industrial pollution control technology to branch and regional staff and to industry.

Section staff undertook a project to upgrade and rewrite guidelines and a manual on incineration of solid, liquid, and gaseous wastes. The work is to be completed in 1978-79. Staff provided assistance and comments regarding AECB licenses.

Approvals

Many plants which received approvals in 1976-77, started operations in 1977-78, including those owned by the following companies in the Sarnia area: Petrosar, Polysar, Union Carbide, Dow Chemical, Dupont, Ethyl Corporation, Sun Oil. The Petrosar Plant, a world-scale producer of ethylene cost \$650 million; the Dow Chemical plant pioneered the biological treatment of effluent brine solutions.

In Thunder Bay, continuing abatement of the grain elevators reached the point whereby 80 per cent of the approvals for control had been issued by year-end. Abatement project costs totalled \$15 million over 1976-77 and 1977-78, principally for particulate collecting equipment and labor.

The Section's greatest area of work concerned approval of Ontario Hydro projects, involving air, water, noise, and biological studies (fish entrainment and propagation). The capital cost of electrical generating plants, such as Bruce A, Bruce B, and the three heavy water plants near Kincardine, Ontario is approximately \$5 billion. Potential electrical power from the complex is 6,000 megawatts (33 per cent of Ontario Hydro's electrical demand). Ontario Hydro's projects at the Pickering, Darlington, and Wesleyville generating stations were in initial submission stages for environmental engineering review at year-end.

Training and Seminars

Section staff helped to plan the Industrial Waste Conference, and to solicit, review, and screen technical papers for presentation.

Staff also helped to develop the Chemical Institute of Canada -- Environment Canada Training Course, the Industrial Abatement Course (MOE), and the Municipal Incineration Seminar (MOE, London).

Applications received and processed in 1977-78 are summarized below:

APPLICATIONS PROCESSED

APRIL 1, 1977 - MARCH 31, 1978

	Received	Approved	Cancelled	Denied
Air	720	628	82	3
Water	85	64	17	0
Waste	88	83	9	0
Total	893	775	108	3

Municipal and Private Approvals Section

This Section processes approval applications made by municipal and private agencies for water supply and distribution systems, wastewater collection and treatment facilities, and solid waste management programs. The Section also licenses septic tank installers and waste haulers.

The Section administers Sections 41 and 42 of The

Ontario Water Resources Act and Parts V and VII of The Environmental Protection Act. It provides technical review for financial subsidy applications made under grant programs of Central Mortgage & Housing Corporation and the Ministry of the Environment Regional subsidy program.

In 1977-78, the Section approved approximately 2,600 applications for programs costing more than \$700 million, including a major expansion at the Highland Creek municipal sewage treatment plant in the Borough of Scarborough (\$13 million), and an expansion to the Oakville water treatment plant in the Town of Oakville (\$5 million).

A policy was developed in 1977-78 to transfer certain approval responsibilities under Sections 41 and 42 of The Ontario Water Resources Act to regional municipalities. The municipalities were requested to participate in a trial transfer program whereby they would conduct reviews of approval applications for the Ministry. The Section prepared draft guidelines for this purpose. A Standards Committee was established, made up of representatives from the Ministry and each participating municipality, to finalize the draft guidelines. During this trial period, assessment is to be made as to whether regional municipalities will assume total authority for issuing Certificates of Approval.

In 1977-78, 223 waste disposal sites were approved, the majority classified as organic soil conditioning sites designed to handle process organic wastes. Eight Environmental Assessment Board hearings were initiated, and one appeal request was received (settled by staff without recourse to Environmental Appeal Board). A favorable Environmental Assessment Board report (following a public hearing) resulted in a major landfill site being approved in the Regional Municipality of Peel.

The Environmental Assessment Board recommended non-approval of landfilling applications by Superior Sand

Gravel and Supplies Limited and Crawford Allied Industries Limited for sites in the Maple area.

Section staff advised various regional municipalities to develop thoroughly documented applications for major landfilling sites. However, because of the need for separate hearings before the Ontario Municipal Board and the Environmental Assessment Board, and widespread public opposition to the establishment of such sites, the municipalities have been reluctant to proceed with their applications or make formal submissions to the Ministry.

Section staff took part in the Hughes Inquiry hearings into the affairs of Waste Management Incorporated. Three former Ministers of the Environment and various Ministry staff were called as witnesses. At year-end Justice Hughes was preparing a final report.

project co-ordination branch

Director: J.C.F. MacDonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating, and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1977-78, the Branch handled 236 construction contracts and administered a capital expenditure of approximately \$135 million. Of this amount, 42.5 per cent was paid out as subsidies under the Ministry's construction program for municipalities. (See Table I.)

The Branch undertook a number of water and sewage works projects for municipalities having no communal

facilities and extended existing facilities in many other municipalities. It also continued major sewage and water projects in South Peel Region, Niagara Region, and York-Durham Area, and undertook major extensions to water treatment facilities in Haldimand-Norfolk Region to permit the development of new housing.

In Northern Ontario, generous provincial government subsidy, combined with Central Mortgage and Housing Corporation grants for high-cost projects, enabled the Ministry to proceed with the provision of communal sewage and water facilities which will allow for growth and expansion of industry and housing. Additional funding, provided through the Ministry of Treasury, Economics and Intergovernmental Affairs under DREE (federal Department of Regional Economic Expansion) and RPB (Ontario Regional Priority Budget) schemes, enabled water and sewage works to proceed under this Branch's direction in Geraldton, Nakina, and Longlac. A similar program for the City of Timmins is proceeding under the City's administration.

In addition to the regularly subsidized sewage and water projects, this Ministry is also administering a number of other projects which are financed either solely by the Ministry of Northern Affairs or jointly by the Ministry of Northern Affairs and the Department of Regional Economic Expansion.

Projects financed by the Ministry of Northern Affairs included sewage and water works for Kenora, Ear Falls, Red Lake, Atikokan, and Schreiber. Jointly-funded projects included works for Longlac, Geraldton, and Nakina. All of these works were well advanced at year-end with completion scheduled for late 1979. Total estimated cost of these works is more than \$30,000,000.

The Management-by-Results (MBR) system continued to be applied to all new projects considered.

MBR project evaluation for 1977-78 was as follows:

	No.	<u>Estimated Cost</u>
New projects accepted	33	\$45,650,000
New projects rejected	27	31,100,000
Total Evaluated	60	\$76,750,000

The Branch continued to administer the grants program for the construction of regional or area sewage and water treatment facilities in regional and specially restructured municipalities. These grants amounted to \$20.350 million in 1977-78. Graphs I through IV for fiscal years 1971-72 to 1977-78 show:

- (1) number and value of contracts tendered;
- (2) construction activity by numbers of contracts;
- (3) annual total expenditures for sewage projects and for water projects;
- (4) annual total expenditures for provincial projects and for municipal projects.

• (See Charts I-IV, pages 65 to 66.)

The Branch's Groundwater Development Section supervised five test-drilling contracts and three well-construction contracts with a total value of \$340,000. The Branch also undertook 13 groundwater surveys and ten special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

The Branch sponsored innovative techniques for the construction of communal facilities in northern areas. Construction was well advanced on a low-pressure, shallow-buried sewer system for the old townsite of Temagami. In Keewatin, test sections of sewers and watermains were installed with different types of insulation and at various depths with monitoring facilities to check performance and resistance to frost action. This information

is being used in designing pipe installations for northern areas.

During 1977-78, the Branch continued to administer the concrete sewer-pipe-plant prequalification program. Thirteen concrete sewer-pipe-plants had prequalified status in 1977-78.

The MEA-MOE Construction Inspectors' Courses (Nos. 1 & 2) were again held. Approximately 50 candidates from municipalities and consulting engineering companies attended the one-week courses.

The Special Activities Unit performed approximately 70 field inspections of Ministry sewer and water projects, both at times of substantial completion and at expiry of contract guarantee periods.

During 1977-78, the Branch's Claims and Contracts Section handled 15 claims of a contractual nature. At year-end, five claims were either in the course of, or had been referred to, arbitration, and six were in the course of litigation. Approximately 65 claims amounting to \$1,005,000 were received pursuant to the Public Works Creditors Payment Act and nine Hearings were conducted. Approximately 119 claims amounting to \$2,425,000 were received pursuant to the Mechanics' Lien Act. The Section dealt with nine insurance-related claims.

resource recovery branch

Director: W. Williamson

The Resource Recovery Branch was established to co-ordinate the Province's Resource Recovery Program which includes the construction and development of the Experimental Plant for Resource Recovery in North York.

Energy Management

This joint program with the Ministry of Energy was continued in 1977-78 with special emphasis on the recovery of energy from both municipal waste and wood waste.

The initial study in the Town of Hearst on the feasibility of utilizing wood waste as an energy source was completed, and the results were sufficiently encouraging that a detailed technical and economic analysis was initiated. This study is to be completed in 1978-79 and includes recommendations on plant scale, technology options, and means of financing.

Although a previous study by the Branch on the possibility of utilizing municipal waste as a source of energy for the Ajax Steam Plant was discouraging, the Town of Ajax decided to proceed with a further study. At the request of the Town, Branch representatives provided advice and assistance. In co-operation with Metropolitan Toronto, a study was initiated to investigate the feasibility of modifying the Commissioner Street Incinerator to enable waste heat to be used to produce process steam for an adjacent industry.

At the request of the Town of Lindsay, a feasibility study was carried out concerning the use of a controlled air incinerator to produce steam for use by either local industry or a hospital complex.

Source Separation

Four source separation projects were developed to obtain information on means of recovering waste newspaper, glass, and cans from individual residences, and to determine how such projects could be incorporated in the Ministry's comprehensive program. Three of these projects, in the City of Toronto, Etobicoke, and Georgetown (Halton Hills), incorporated curbside collection by municipal vehicles. The fourth project in Aurora incorporated the use of depot systems. The Branch is responsible for general development of the program, public information, and monitoring of the results. Income from recovered materials will be used to defray municipal costs.

The success of the pilot projects for fine office paper separation led to the initiation of a similar program throughout the Ministry's head office building at 135 St. Clair Avenue West. If this type of full-scale operation proves successful, it could then be extended to other public and private office buildings. At the request of Management Board of Cabinet, the Branch initiated a study on the feasibility of paper recovery throughout government buildings in Metropolitan Toronto.

Technological Development: Experimental Plant and Demonstration Projects

Construction of the \$15 million Experimental Resource Recovery Plant was completed, and plant operation was commenced by the private waste management company (Browning-Ferris Industries of Toronto Ltd.) contracted for this purpose. The design concepts utilized for the waste receiving and direct transfer sections of the plant proved to be completely successful, and initial results from the processing operations appear equally promising. Facilities were also installed to test the use of refuse-derived fuel as a partial replacement for coal in a cement kiln in Woodstock (Canada Cement Lafarge Ltd.). A demonstration project is to start in 1978-79.

A 12-month demonstration of the use of advanced waste collection systems in the City of Windsor was completed. A detailed technical and economic evaluation of the systems was made, and a report is to be published for consideration by other municipalities in the Province.

A committee, representing the Branch, the Regional Municipality of Peel, and Reed Limited, was set up to develop two agreements: 1) for assessment of the technical and economic viability of the Reed Limited proposal for a material and energy recovery plant in Peel, and 2) for plant design, construction, operation, and marketing, if the proposal is found to be viable.

Detailed engineering design and equipment selection for the "Watts from Waste" project continued. Plant construction is to commence in 1978-79 at the Toronto Lakeshore Hydro Electric Generation Plant.

Central Processing Plants

A waste management planning study was carried out in Cornwall, while another such study was initiated in the Timmins Area.

A joint provincial-federal study was initiated in North Bay to investigate the feasibility of utilizing waste from North Bay and the Armed Forces base to provide steam for base requirements. The study could lead to a solution to bird problems associated with the existing North Bay landfill disposal site.

A committee was set up in the Niagara region, representing the Branch, the Regional Municipality, and the Ontario Paper Company, to examine the feasibility of establishing an energy resource recovery plant in Thorold that would produce steam from garbage waste for use by the Company.

The Branch continued to work with the Regional Municipality of Halton on a proposed resource recovery plant, and carried out a study to select possible sites. The Branch also carried out a detailed financial analysis and a marketing study for such a facility.

Market Development

Marketing contracts were entered into for corrugated cardboard and ferrous metal recovered at the experimental plant. By arrangement with Metropolitan Toronto, sepa-

rately collected waste newspaper in the Metro area was delivered to the plant and baled to improve its marketability.

Investigations continued concerning possible additional markets for paper, ferrous metals, glass, and compost.

Effective August 1, 1978, the Resource Recovery Branch was incorporated into the Ministry's new Waste Management Branch.

regional operations and laboratories division

northwestern region

Assistant Deputy Minister: W.B. Bidell

Acting Regional Director: R.M. Gotts

Municipal & Private Abatement

Regional staff inspected all communal water and sewage treatment facilities within the Region. In addition, they conducted various special surveys and studies, including several bacteriological and chemical studies of water quality in municipal water distribution systems, two loading studies at water pollution control facilities, a performance evaluation of a Bio-Disc sewage treatment unit, an infiltration study of a municipal sewage collector system, and water pollution surveys of several municipalities. Considerable construction activity occurred within the Region with regard to municipal water and sewage projects.

Staff inspected all municipal landfill and derelict motor vehicle sites, and refuse disposal sites kept by the Ministry of Natural Resources. Municipal participation in "Project Remove" resulted in the collection of 2,500 derelict motor vehicles. Establishment of the Waste Management Improvement Program enabled many municipalities to upgrade facilities to meet present day standards. Compliance with the new carbonated soft drink container legislation, initially slow in remote areas, improved considerably toward year-end, mainly as a result of increased staff activity and greater public awareness.

Cottage pollution control programs were completed on the Shebandowan Lakes system, continued along the north shore of Lake Superior east of Thunder Bay and in the Kenora and Fort Frances areas, and completed on Pelican

and Abram Lakes in the Sioux Lookout area. Staff reviewed over 1,350 cottages during the 1977 summer period.

The Region conducted the boating and marina inspection program with particular emphasis on ensuring the adequacy of shore-based pump-out facilities. The boat inspection program included 164 regional inspections; one summary conviction ticket was issued in the Thunder Bay area.

Enforcement of The Pesticides Act, 1973 and Regulations emphasized the licensing of land exterminators for herbicide applications and structural exterminations for insecticides in terminal grain elevators.

Industrial Abatement

The main industrial abatement effort in 1977-78 was again directed at correcting environmental problems associated with the pulp and paper industry. Three Control Orders under The Environmental Protection Act and three Requirement and Directions under The Ontario Water Resources Act were issued during the year covering pollution abatement programs at pulp and paper mills in the Region. Notices of Intent to issue Control Orders at two other mills were pending with issuance anticipated very shortly after the year-end. With completion of this effort to formalize abatement programs in this industry, all mills in the Region will be covered by such formal programs with one exception. The excepted mill completed its formal program at year-end and a new one was being considered.

The new Great Lakes Paper Company Limited, Thunder Bay kraft mill, utilizing the closed-cycle effluent system, continued to improve its performance. The Company made a formal commitment to the Ministry under the Requirement and Directions to convert its older kraft mill at the same site to this system.

The mercury cell chlor-alkali plant operated by American Can of Canada Limited at Marathon was closed down and dismantled under the terms of a Ministry Control Order. Ministry staff supervised the dismantling operation and the subsequent encapsulating of contaminated materials in concrete in a Ministry-approved landfill site.

Two prosecutions by the Ministry were successfully completed. Amercian Can of Canada Limited was found guilty of 16 charges laid by Ministry staff under the federal Fisheries Act concerning excessive mercury discharges from its Marathon chlor-alkali plant and was fined \$64,000. Reed Ltd. was found guilty of five charges laid under The Environmental Protection Act relating to pollution of the Wabigoon River by its Dryden pulp and paper mill and was fined \$5,000.

Dust abatement programs progressed at the terminal grain elevators in Thunder Bay. Within the City, dustfall measurements have shown an overall reduction of 30 per cent since these programs were started. At dustfall stations near elevators, where programs are completed, reductions are as high as 70 per cent.

It is anticipated that the end reduction in grain dust emissions will be 95 per cent upon completion of all programs in 1978-79.

Air Quality

The Air Quality Assessment Unit continued major monitoring surveys in seven urban centres and issued annual reports for these areas for the year 1976. Special investigations utilizing vegetation, soil, and snow sampling techniques and direct-air monitoring were also conducted near several forest, mining, and grain elevator operations. The regional network of 130 instruments, several of which were added during the year, measured particulate pollutants, sulphation rate, sulphur dioxide, hydrogen sulphide, wind direction, and wind speed.

Water Quality

The Water Resources Assessment Unit operated a 47-station water quality monitoring network for lakes and streams in the region and conducted regular samplings for the International Joint Commission on 11 streams entering Lake Superior. Monitoring was also carried out on the Rainy River for the Rainy River Board of the International Joint Commission. Evaluation of recreational lakes included a portion of the Lake-of-the-Woods, and seven lakes were included in the "Self-Help" program. Major surveys included the assessment of surface waters affected by mining operations at Red Lake and on Sturgeon Lake. A special survey of Thunder Bay inner harbour in the vicinity of the Abitibi Provincial Paper Mill was also undertaken. Fish for mercury analysis were collected from the Rainy River and Peninsula Harbour.

Environmental Planning

The Approvals and Planning Unit continued its responsibility for co-ordination of regional responses to environmental impact statements and review of municipal subdivision proposals. In co-operation with the Water and Air Assessment Units, magnetic tape data files were created to improve regional capability to retrieve, analyze, and interpret information collected at water and air quality monitoring stations.

Laboratory Operations

In May of 1977, the new Thunder Bay Regional Laboratory was officially opened. The design of the building allows for expansion of analytical capabilities in the chemical and microbiological sections. Significant time was devoted to developing expertise in the analysis of soil and vegetation. In line with the trend of past years, the number of samples received increased over that of 1976-77.

Utility Operations

The Utility Operations Section operated 11 water treatment plants and 12 sewage treatment plants. Five new projects were commissioned during the year, and the transfer of operating responsibility of the Thunder Bay W.P.C.P. to the City of Thunder Bay was completed. Construction starts were made on five water treatment plants and three sewage treatment plants.

northeastern region

Director: C.E. McIntyre

Industrial Abatement

Seven Control Orders and two Requirements and Directions were issued to four pulp and paper mills, one abandoned base-metal mine, one non-ferrous smelter, one lumber mill, and two uranium mining and milling operations.

The new smelter at Falconbridge Nickel Mines was completed and will reduce SO₂ emissions to a maximum of 465 tons per day.

A detailed quality study of effluent (BOD, COD, and toxicity) from the Spruce Falls Power and Paper Company's new thermal mechanical pulping unit was carried out. The company also completed an assimilation study on the Kapuskasing River in response to a Control Order.

Cleanup operations of the heavily PCB-contaminated soil at Dowling was completed. Further investigations regarding deeper PCB penetration of the soil is to continue in 1977-78.

Municipal and Private Abatement

The Region completed 50 lake and municipal surveys and visited 1,145 cottages and residences to check water supply and sewage disposal systems.

Under "Project Remove", 22 municipalities participated in the collection of 4,697 derelict motor vehicles. In addition, 13 municipalities took part in a program to improve their solid waste management operations. Included were two beach cleanup projects.

Seven pending legal actions in the municipal and private abatement area were resolved in 1977-78, and six new actions were initiated. Considerable manpower was spent on collecting and assessing radiological data, preparing interim status reports, and participating at various meetings and review committees concerning the Environmental Assessment Hearings on the proposed mining expansions at Elliot Lake.

Air Quality

A total of 220 instruments and recorders monitored air quality throughout the Region. In addition, studies for suspended particulate were conducted in Cobalt (arsenic), Matheson and Matachewan (asbestos), Elliot Lake and Agnew Lake (radiological), Sault Ste. Marie, and Little Current.

The Plant Pathology Unit collected over 1,700 vegetation and soil samples throughout the Region and investigated 23 complaints of possible air pollution injury to vegetation. A special white pine study and remote sensing program involving satellite and low-level photography was

initiated to study the effects of air pollutants on vegetation in the Wawa area. A leaf litter decomposition study was also initiated in the Timmins area to study the effects of zinc in the litter layers.

Water Quality

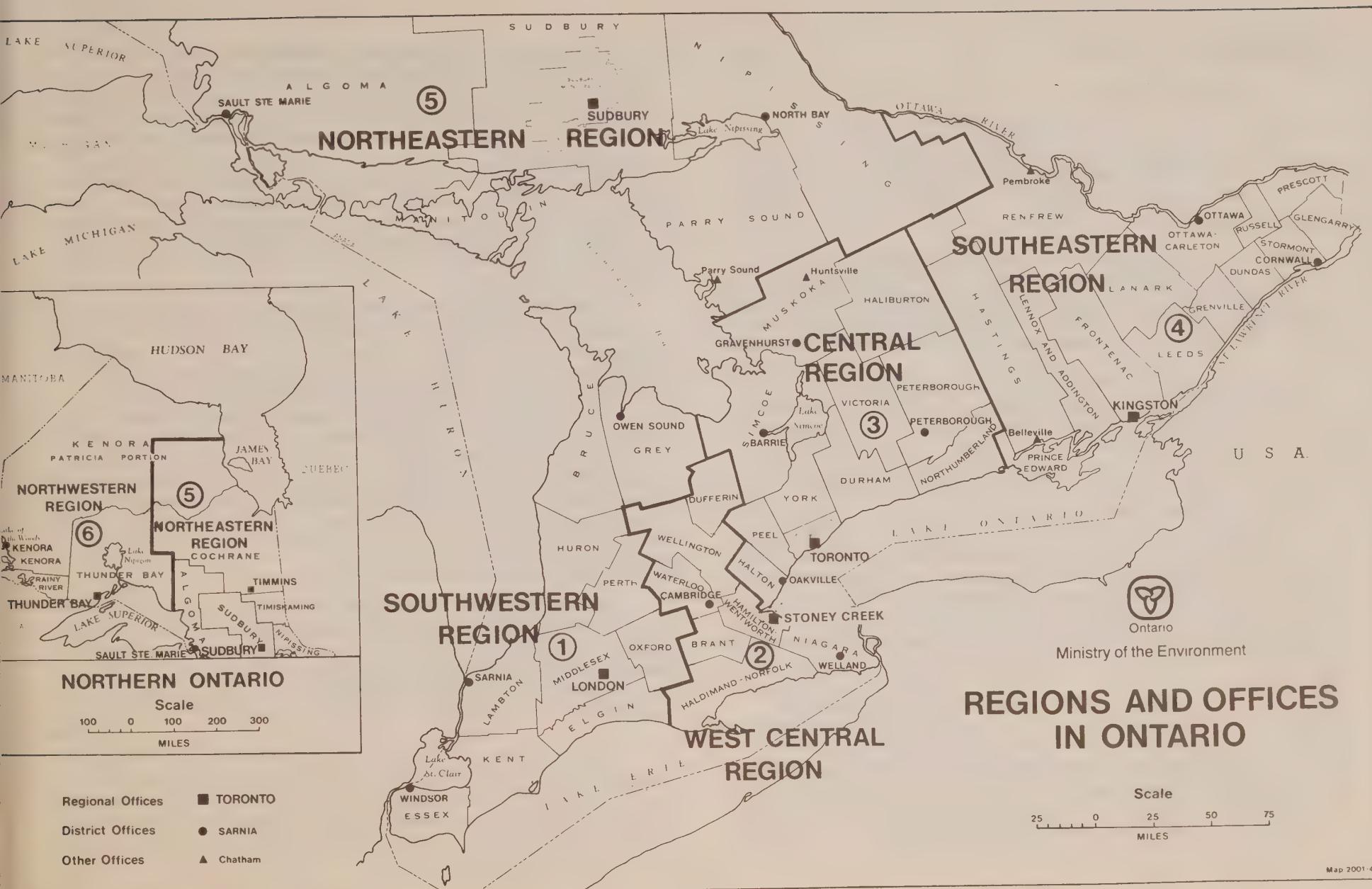
The Region completed a significant number of water quality projects including: springtime phosphorus classification studies on 36 lakes, six ground-water interference investigations, 16 ground-water contamination investigations, 29 ground-water assessment studies, and 28 water quality assessment studies. In addition, the Region maintained 154 routine water quality monitoring stations.

Utility Operations

The region operated 22 water treatment, and 45 sewage treatment facilities, six of which went into operation during the year.

The Region completed the design of a sludge dewatering system for the North Bay W.P.C.P. and called tenders for the supply and erection of a centrifuge building. It is anticipated that the City will save approximately \$1.7 million by having the facility designed and constructed through the Ministry rather than through a consulting engineering firm.

The design and construction of a sludge thickening tank for the Sudbury W.P.C.P. was nearing completion at year-end. The tank will obviate the need for aerobic digestion at the plant and result in an energy saving estimated at approximately \$100,000 per year.



Ministry of the Environment

REGIONS AND OFFICES IN ONTARIO

A scale bar for Figure 1, labeled "Scale". It features a horizontal line with tick marks. The labels "25", "0", "25", "50", and "75" are placed above the line at regular intervals. Below the line, the word "MILES" is centered.

southwestern region

Director: D.A. McTavish

Industrial Abatement

At Sarnia's request, the Ministry extended the Air Pollution Index (API) system to that City. Although the preparatory level of 32 was exceeded once in 1977-78, it is considered unlikely that pollution levels will occur that will require area industries to curtail operations.

A program was introduced in 1976-77 to minimize pollution problems arising from the use of vegetable cannery wastes as a livestock food supplement. Follow-up of this program in 1977-78 showed that users of such materials were taking precautions to avoid water pollution, and no major problems were experienced in this regard during the year.

There was a 38 per cent increase over 1976-77 in the number of applications filed by farmers for Certificates of Compliance. The increase was primarily due to municipal controls applied in many townships and greater environmental awareness and concern on the part of livestock farmers.

Southwestern Region and the Air Resources Branch continued work on revision of the regulation governing sulphur dioxide emissions in the Sarnia area. It is expected that the new regulation will be issued in 1978-79, and that implementation of appropriate compliance programs will follow in order to achieve the Ontario objective for sulphur dioxide in the area.

As a result of increasing concern over metals in sewage treatment plant sludge disposed of on farmland, the Region initiated a study in the City of Stratford to determine the practicability and the economic implications of reducing the metal content of such sludge. The study includes plating plant surveys, the sampling of effluent discharges from these plants, and the sampling of various operations at the Stratford sewage treatment plant. Alternatives for reducing metal discharges from industries and ways to implement a wide-scale abatement program were being evaluated.

Staff of Southwestern Region and the Air Resources Branch maintained frequent communication with their counterparts in Michigan and Wayne County in accordance with provisions of the Transboundary Memorandum of Understanding. Prominent issues in 1977-78 were a proposed expansion of Detroit's sewage sludge incineration facilities; an unusually high incidence of electrical equipment fires in West Windsor, attributed to particulate fallout from Wayne County sources; a proposal by the Peerless Cement Company in Detroit to use one of their cement kilns for the destruction of PCBs.

Municipal and Private Abatement

The Region closed a privately-owned and operated landfill site in West Oxford Township after eight wells were polluted by the leachate emanating from the site. Negotiations to establish alternate water supply systems for affected individuals in the area were under way at year-end.

The City of London opened its Westminister Township landfill site. The City is phasing its Clark Road site out of operation and plans to convert it to a transfer station. The County of Elgin entered into an agreement with a private hauler for garbage collection and disposal.

The Environmental Assessment Board approved re-zoning of land in the area for disposal purposes provided certain conditions were met. At year-end regional staff and the owner of the site in question were negotiating the establishment of these conditions.

The City of Woodstock expanded the capacity of its sewage treatment plant from 4.5 million gallons per day to 8 million gallons per day in order to be able to meet the requirements of the Thames River Basin Study. The City of London doubled the capacity of its Adelaide Sewage Treatment Plant from 2 million gallons per day to 4 million gallons per day and incorporated nitrification at the same time. Both expansions are to be finished in 1978-79.

The City of Chatham initiated design for expansion of its sewage treatment plant and began a search for a suitable landfill site to serve Chatham and other municipalities in the County of Kent. Opposition to the establishment of a landfill site in rural Kent County was encountered. At year-end Ministry staff were meeting regularly with the Solid Waste Management Committee of the County of Kent to review available disposal alternatives.

The Ministry developed an interim servicing plant for the Township of Collingwood. The interim works would be extensive and designed to operate for an extended period. If necessary, the works would become permanent if anticipated area growth did not take place. The Ministries of Industry and Tourism, Environment, Housing, and TEIGA are jointly working on this project.

The Ministry undertook a landfill site upgrading program in Southwestern Ontario, entering into 19 contracts with municipalities and spending approximately \$70,000. The program resolved several long-standing disposal problems. Many of the municipalities also expended additional funds to upgrade their sites further.

Air Quality

During 1977-78, the Air Quality Assessment Unit maintained 90 monitoring sites, collecting pollutants over 30-day periods; 32 instruments, collecting suspended particulates every sixth day for 24-hour periods; and 68 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, and 553,000 measurements were collected.

The air quality monitoring network was expanded with the introduction of three continuous ozone monitors in rural areas, particulate monitoring in St. Mary's and Goderich, and intensified monitoring for particulates and sulphur dioxide in Windsor and Sarnia.

Special surveys were conducted to assess the impact of grain elevators on dustfall at Blenheim and to ascertain the source of fluorides in Ingersoll.

Environmental Planning

The Approvals and Planning Unit reviewed 125 applications for the approval of pollution abatement equipment and facilities associated with air, water, and land resources. Regional comments and recommendations were provided on 20 provincial projects, and comments on approximately 90 official plans, amendments, and zoning orders were provided to the Ministry of Housing. Fifty-five appraisals were made of other land use documents and development proposals.

Water Quality

The Water Resources Assessment Unit participated in establishing waste control requirements for 26 municipalities based on assessments of surface water assimilation capacities. Surveys were conducted on 15 watercourses and included a major 60-station biological-chemical

assessment of the St. Clair River as part of the St. Clair River Organics Study. Programs were also expanded to include winter stream assessments.

The Unit promoted the development of an artificial marsh treatment experiment at Listowel and an infiltration land treatment system at Markdale. Increased emphasis was attached to identifying, and educating the public to the significance of, agricultural and urban runoff contributions to impaired water quality.

The Unit investigated 50 complaints concerning water supply contamination, and completed 49 water quality interference investigations and ten landfill assessments. The monitoring of 30 private water wells in Lambton County was continued to ensure that past deep well disposal activities had not created contamination problems, and fluid levels were monitored monthly in five brine injection wells. Long- and short-term water level fluctuations in the Region were assessed by means of a 76-point observation well network.

Through the Water Well Inspection Program, 1,800 water wells were investigated, of which 40 per cent were considered to be deficient in one or more aspects. A total of 2,213 well records were reviewed and corrected prior to locating and plotting them on permanent map records. Thirty complaints of improper well construction and pump installation were investigated. Increased emphasis was placed on proper well abandonment and plugging.

Altogether, Water Resources staff provided short-term reviews or assessments on 341 separate matters such as marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests, sewage design reports, and various resource development proposals.

Laboratory Operations

The London Regional Laboratory performed 156,110 chemistry tests on 18,054 samples and 43,905 microbiological tests on 14,892 samples.

An automated "Hardness" method was developed and several experiments were completed involving survival of the aerobic bacterium Pseudomonas aeruginosa during anaerobic digestion. This involved considerable developmental work as did work on media selection for isolation and identification of Clostridium perfringens.

Assessments were completed on biodegradation of selected organic compounds recovered from river sediments as a contribution to the St. Clair River Organics Study.

Utility Operations

In 1977-78, the Regional Utility Operations Section managed and operated 66 sewage treatment and collection facilities and 45 water treatment, trunk main, and distribution facilities serving approximately 740,000 people. The Section consisted of four management staff, three maintenance co-ordinators, one safety officer, and 147 permanent and 33 part-time plant operating personnel.

The safety training program increased in momentum. Regional and district office staff, and water and sewage treatment plant personnel received training in "Entry into Confined Spaces", defensive driving, fire-fighting, and first aid. A Regional Safety Committee comprising staff from all disciplines was formed.

west central region

Director: C.J. Macfarlane

The West-Central Region is a diverse matrix including densely-populated industrial and commercial centres as well as less populated rural and farming areas. Population is approximately 1.4 million, comprising 400,000 households.

Air Quality

Air Quality in Hamilton improved only marginally in 1977-78 after more marked improvement in previous years. Suspended particulate levels were slightly lower in line with significant decreases over the previous seven years. While ozone levels improved with fewer hours of excessive levels, NO₂ levels continued to increase as they did for three years before. Other parameters were generally unchanged at Hamilton. Airborne dust from roads and city streets continued to provide a significant input to total particulate load. Further improvement in air quality will be achieved when particulate from this source is reduced.

At Nanticoke, dustfall levels increased to critical levels. Fluoridation and sulphation rates increased significantly, but were still below criteria levels.

Elsewhere, there was general improvement with regard to total suspended particulate levels and the number of hours of excessive ozone levels. Other parameters were generally unchanged at acceptable levels with the exception of two local sites in Niagara Falls and Galt. No Air Pollution Index (API) episodes were recorded in Welland or Niagara Falls.

Public complaints regarding air quality dealt primarily with malodours. Progress was made in reducing the degree of odour emissions, but many "controlled" sources continue to be unacceptable to residents. In many instances, complaints arose as a result of changed land uses (e.g., residential developments built adjacent to industrial lands).

Water Quality

The Grand River and its watershed serves many people and municipalities and is almost entirely contained within the West-Central Region. It is used for the assimilation of municipal sewage and industrial wastes, for water supply, and for recreation. Proper management of the entire system is of major importance since a watershed is continuous and interconnected and what affects one part usually affects another.

West-Central Region was involved in numerous studies and activities related to the Grand River, including:

- (1) a major report, "Water and Sewage Options for the Central Grand River";
- (2) assimilation studies for the Nith and Upper Grand Rivers including New Hamburg, Elmira, Fergus, and Elora;
- (3) Negotiations with Guelph for the operational integration of the water supply and sewage treatment facilities with respect to river water quality including the first requirement for nitrification of a municipal effluent;
- (4) provision of extensive information for the formal environmental assessment being undertaken by the Grand River Conservation Authority;
- (5) participation in detailed planning of the ongoing GRIC study of the basin.

In other areas, the aeration system was continued in Hamilton Harbour with some further improvement in water quality. A Certificate of Approval for the sewage treatment plant expansion at Dundas was issued. It included, for the first time, specific emission requirements tailored to the preservation of Cootes Paradise marsh, or Dundas marsh, as a natural conservancy area.

Industrial Abatement

Six paper mills operate in the Niagara Region. Control Orders were served on three mills and Program Approvals were accepted for two mills. All actions were directed at reducing liquid waste discharges from their operations. The sixth mill was already in compliance with required emission standards. Final compliance dates ranged from December 1979 to December 1982.

Dofasco and Stelco again made major capital expenditures on pollution control equipment for cleansing of air from blast furnaces, sinter plants, coke ovens, melt shops, and a water filtration plant. Both companies undertook extensive measures to control windblown dust from coal piles. As a result, no further complaints were received concerning this problem.

Fluoride emissions from IMC in Port Maitland caused high fluoride levels in forage in the early summer weeks of 1977. The company shut down its super phosphate manufacturing process and made process modifications. Subsequent sampling of forage indicated a reduction to acceptable levels. To reduce phosphorus discharges to the Grand River, the company is planning to phase out one of its gypsum storage ponds.

Cyanamid of Canada improved control of brownish-colored oxides of nitrogen emissions at its Niagara Falls plant.

Rothsay Concentrates continued to be the most significant generator of odour complaints. In 1977-78, the company installed new abatement equipment and undertook major plant changes which should result in reduced odour emissions.

Municipal & Private Abatement

Scheduled inspections and monitoring of municipal (and communal) water, sewage treatment, and solid/liquid waste disposal facilities received greater emphasis during 1977-78 than in previous years and accounted for 30 per cent of total municipal and private abatement field activity.

Construction was under way for a new water treatment plant at Fort Erie. New plants or expansions were being planned for the St. Catharines (De Cew) and Port Colborne water treatment plants.

West-Central Region's many small communal water works (serving summer cottage areas and a number of small municipalities) were frequently inspected once again in 1977-78. Their operators now maintain adequate records and are capable of carrying out routine sampling for themselves.

In a number of smaller municipalities, old septic tank systems are either failing or inadequate. The Ministry's new grant policy for private systems should lead to some improvement in this regard.

West Central Region encouraged a number of municipalities to initiate water and sewer restoration programs. In Port Colbourne, leak repairs resulted in a 40 per cent reduction in water consumption at a saving to the City of \$100,000 per year.

The sanitary landfill sites of several municipalities are becoming full, and new sites cannot be readily obtained. Several existing landfill sites in Hamilton-Wentworth are overtaxed, and proper closure will be most difficult. A new landfill site for the Region is being proposed, but first must undergo environmental assessment.

central region

Director: P.G. Cockburn

Central Region is one of the heaviest industrialized and intensively used recreational areas in the Province.

Significant activities included an air quality improvement program in the core area along the Lake Ontario basin (studied in regard to receiving capacity), environmental control activities in recreational areas, liquid waste disposal, and the investigation of private well problems.

Air Quality

Major improvements in Toronto's air quality achieved over the last ten years were maintained during 1977-78. The sulphur dioxide level was essentially unchanged from 1975 at a value well below the annual criterion (see Table III). Suspended particulate remained slightly above the annual criterion (see Table IV). The API (Air Pollution Index) exceeded the maximum desirable level on only three occasions. Table II summarizes the number of occasions the API has exceeded the desirable level for Toronto since its inception in March 1970.

Monitoring for hazardous substances was continued in 1977-78. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Airborne asbestos was monitored at five asbestos-using plants in the Region. Emergency monitoring for hazardous substances at the site of major fires was initiated.

During the year, 349 applications were processed and approved related to environmental emissions. Evaluations involved analysis of combustion equipment, plant, and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and those of other potentially-hazardous substances such as TDI, MDI, PVC, and PCB.

Water Quality

Protection of water quality in recreational areas occupied a large part of regional staff time. Activities included lakeshore surveys of sewage works serving cottages, self-help programs to determine the quality status of recreational lakes, lake water quality surveys, the survey of Muskoka Lakes for mercury in fish, the survey of lakes in Haliburton, and the review of the nutrient inputs to the Scugog Lake and River.

Recreational lake surveys were undertaken in Belmont, Round, Cordova, and East and West Twin Lakes in Peterborough County; the Milford Bay area of Muskoka Lake; Paudash Lake; and Georgian Bay at Honey Harbour. A total of 2,634 cottages were inspected to ensure that sewage treatment facilities were adequate.

Concerned cottagers and permanent residents on 81 recreational lakes participated in the Self-Help Program. The data collected enables the trophic status of these lakes to be determined and subsequently monitored on a yearly basis.

In response to the discovery of elevated fish mercury concentrations, an extensive study was conducted within the Lake Muskoka Drainage basin. Sediments and water from more than 20 lakes were analyzed for mercury content. Additionally, all municipal and direct industrial waste discharges were investigated as were any possible historical sources of mercury. The survey failed to account for the elevated fish mercury concentrations and is to be continued in 1978-79.

A water quality report on the Scugog River was released indicating the River to be enriched with nutrients and organic materials. The discharge of the Lindsay sewage lagoons into the river contributes, to a minor degree, to this enrichment problem, and improvements in their treatment efficiency were made.

A co-ordinated program, involving the Algonquin Region and the Ministry of Natural Resources, enabled water quality surveys to be conducted on 27 previously unsurveyed lakes within the Dysart (et al.) Planning Area of the Provincial County of Haliburton. This data will be used primarily to assess future development proposals in the area.

The Region investigated several major ground-water level interference problems and alleged well contamination problems affecting private wells. Extensive surveys of affected wells in Glen Williams and Unionville established that 80 per cent of shallow-dug wells were poorly constructed and/or maintained, and that their water contamination problems were directly related to surface waters entering into them.

Industrial Abatement

The Region expanded the radiological monitoring of surface waters downgradient of abandoned uranium mine tailing areas in the Township of Cardiff to determine the impact of these tailing areas on the water quality of

nearby streams and lakes. The water quality of Paudash and Eels Lakes situated downgradient of these tailing areas are within the permissible drinking water criteria for gross beta emitters and Radium 226.

The Region was involved with clean-up operations, public liaison, and air monitoring in connection with two major fires and an explosion. The first fire was in an underground, PCB-filled transformer in the City of Toronto. The incident occupied approximately 55 per cent of available district staff time for a one-month period.

The second fire took place in a warehouse containing APS and PVC materials in the Village of Colbourne. The explosion occurred at a plant in the Town of Vaughan where two drums of insecticide exploded, causing a plume of mercaptan-like odour to travel across the eastern part of Metropolitan Toronto.

Progress was made with long-term control programs at automotive assembly plants. Tests conducted at the General Motors plant in Scarborough indicated a significant reduction in odour emissions as a result of a process change. Further studies are to be carried out at American Motors in Brampton and Ford in Oakville to define more clearly the specific source and nature of odour emissions at these operations.

Eighty-seven garbage incinerators were phased out of use in 1977-78. The first successful prosecution related to emissions from a garbage incinerator occurred in June 1977 against an apartment building in Etobicoke.

In Peterborough District, a federal government environmental assessment panel recommended that Eldorado Nuclear Limited not build a new uranium refinery at Port Granby. Camindex Mines applied for reinstatement of uranium claims in the Looncall and Wolfe Lake recreational areas. Leases were granted to the company by the Ministry of Natural Resources on the condition that any proposed

mining venture be made subject to an environment assessment under The Environmental Assessment Act.

The Beare Road landfill site in the Borough of Scarborough continued to be the only outlet for the disposal of inorganic liquid wastes in 1977-78. The deadline for closure of the site to liquid wastes was extended from December 21, 1977 to April 30, 1978, at the request of this Ministry. At year-end, a task force was established by Metropolitan Toronto and the Ministry to find alternative means for the disposal of liquid wastes.

The Region of Durham presented a proposal for having the Ajax sewage treatment plant converted into a liquid waste treatment facility when it is phased out as part of the York-Durham sewage servicing scheme.

A hearing is to be held in 1978-79 to review the possibility of a cement plant in the City of Mississauga using toxic liquid industrial waste as a fuel.

Environmental Planning

Central Region continued to participate in provincial-level planning and in inter-agency planning with regional municipalities. Staff provided environmental planning input to the review of an increasing number of development proposals submitted to the Province under the requirements of The Planning Act. Liaison with municipal planning staff, planning consultants, and private developers increased in an attempt to introduce environmental concerns at an early stage of design.

Activities resulting from the requirements of The Environmental Assessment Act increased, as several major undertakings of the provincial government are located in Central Region.

southeastern region

Director: R.E. Moore

Routine workload in 1977-78 involved over 6,300 inspections of water, land, and air pollution control facilities operated by municipalities and industries. This represented an increase of 50 per cent over the previous year.

Water Quality

The Region operated four streamflow gauges and 18 well recorders, maintained 170 water quality monitoring stations, and, in conjunction with the Ministry of Natural Resources, surveyed 34 recreational lakes. The Cottager's Self-Help Program was increased to include 93 lakes in the Region.

Major reports released during the year included:

- (1) Concentration of Mercury in Sediments and Fish of the St. Lawrence River;
- (2) A Report on Water Quality Management of the Lake Trout Waters of Southeastern Ontario;
- (3) Cottager's Self-Help Program: Enrichment Status of Seventy-Nine Lakes in the Southeastern Region of Ontario.

Environmental Planning

The Region handled 1,244 requests regarding Official Plans and Amendments, Zoning Bylaws, Environmental Assessments, Certificates of Compliance, ODC/DREE applications, and Sewage Works Approvals -- an increase of approximately 20 per cent over 1976-77. There was also increased

liaison with local municipalities, planning boards, other agencies and ministries of government, and consultants respecting this Ministry's input to urban, rural, and recreational land use planning.

Industrial Abatement

The Region investigated 112 spill incidents including a Texaco Domestic Pipeline Division leak of 31 kl of furnace oil and 114 kl of gasoline at a terminal in Ottawa. This incident was caused by ice heaving free lines connected to a pump. Four Enforcement Orders were issued, including one to a company discharging arsenic-bearing effluent to the Moira River. Approximately 1,100 complaints were handled, almost all successfully.

Laboratory Operations

The Regional Laboratory in Kingston continued to be a key function in terms of assistance to field operations. Workloads were increased by 30 per cent in the chemistry laboratory and 40 per cent in the microbiology area. These increases stemmed equally from municipal and private abatement field surveys and water resources assessment programs.

Utility Operations

Regional staff operated 72 water and sewage treatment facilities, of which seven were added during the year. A Management-by-Objectives program, introduced into utility operations, showed 80 per cent of the sewage works and 92 per cent of the water works in the South-eastern Region to be meeting objectives. In conjunction with this program, the Region participated in a one-year plant performance data computerization experiment, the results of which led to the development of a new data collection system for Ministry projects throughout the Province.

Municipal and Private Abatement

The Waste Management Program was quite successful; the main effort was directed toward the upgrading of problem sites. The funding program was very well received by the municipalities and significant improvements were accomplished. Solid waste disposal sites and systems continued to occupy considerable time and required 903 inspections.

Unanticipated assumption of Part VII work from the Ottawa Health Unit necessitated drastic workload revisions for Ottawa district staff. Approximately 45 per cent of staff time was spent on this program involving approximately 1,300 inspections of Part VII systems.

Boat Marina and Ice Hut programs were maintained through 1,778 inspection visits. The lakes regularly toured by the Ice Hut Program have shown general improvement, and the Boat Marina Program has met with considerable success.

laboratory services branch

Director: G.C. Ronan

The Laboratory Services Branch provides analytical support to the Ministry's environmental quality assessment and pollution abatement programs. In 1977-78, more pronounced diversification of field programs and increased characterization demands resulted in a considerable increase in the number and variety of tests required of the Branch. This, in turn, intensified the need for new methods and techniques and required more stringent quality control.

Tests Performed

The Branch performed 1,780,000 tests in 1977-78 as compared to 1,650,000 tests in 1976-77, an increase of approximately eight per cent. Of this number, 77 per cent were carried out by the Toronto laboratories, and generally required sophisticated instrumentation and special expertise. The remaining tests (23 per cent) were conducted at the Ministry regional laboratories in Kingston (7 per cent), Thunder Bay (5 per cent), and London (11 per cent). (See Table II, page 69.)

The Branch performed 48.2 per cent of the tests in support of regional programs; the rest, for other Ministry branches and government agencies. Analyses for the Air Resources Branch amounted to less than 10 per cent of the total due to many air quality parameters being determined by automatic field instruments.

Analytical Support for Special Programs

Special program support included tests for: the Pollution From Land Use Activity Reference Group (PLUARG) Program (40,000 tests); the Great Lakes Program (120,000 tests); the Sudbury Environmental Study (30,000 tests). Fewer tests were required by these programs in 1977-78 than in 1976-77.

Recreational lakes received more attention this year as attempts were made to relate water composition to health effects. The relation between the presence of *Pseudomonas aeruginosa* and ear infection outbreaks among bathers was examined in conjunction with an epidemiological study of the affected population.

Laboratory sections undertook and/or participated in major surveys for hazardous substances involving most of Ontario's aquatic and atmospheric environment. Asbestos analysis output was doubled. Among trace metals, mercury continued to be of major concern. Based on analytical

data gathered over a number of years, projections indicating declining mercury levels in fish were borne out. In co-operation with other branches and ministries, staff participated in the collation and interpretation of mercury data in order to provide fish consumption guidelines for anglers.

The Branch made more than 20,000 tests each for lead, copper, zinc, and arsenic. Extensive surveys for PCBs and pesticide residues were carried out on fish collected from across the Province. Pesticide analysis was increased by nearly 50 per cent to include 100,000 tests.

Analysis for haloforms in drinking waters was continued with sample sources covering most of the Province. The St. Clair Study was further extended to include a wider spectrum of toxic organics possibly discharged by industries in that region. The effluents of each industry were analyzed, and the significance of the levels of organics were identified and evaluated. The presence of petroleum hydrocarbon residues in water was demonstrated in several cases, and the sources were identified and eliminated. The program to measure carcinogenic polynuclear aromatic hydrocarbons was continued, and in several areas the respective sources were identified.

Laboratory Organization

The Branch operated under a new organizational structure in 1977-78. Up to late 1976-77, samples were processed on the basis of being either air, water, or soil, etc. The new arrangement focuses primarily on the kinds of analytical tests required and has resulted in the development of a more comprehensive and thorough system for the examination of samples and in more detailed and informative reports being sent to the Branch's clients.

The Branch consists of seven sections:

- The Water Quality Section conducts specific routine water and wastewater quality tests.
- The Air Quality Section conducts specific routine air quality tests on atmospheric samples and trace metal tests on all types of environmental samples.
- The Pesticides Section conducts specific routine organic tests and non-routine analyses related to field work on all types of environmental samples.
- The Organic Trace Contaminants Section detects, identifies, and determines organic pollutants in all types of environmental samples.
- The Physical Methods Section determines physical and chemical properties of environmental samples by non-destructive techniques.
- The Microbiology Section determines bacteria levels in waters and wastewaters, identifies microorganisms, and conducts microbiological assessment of the mutagenicity of pollutants.
- The Administrative Section handles personnel, finance, and general administration; operates the Laboratory and Research Complex safety program; administers the Central Stores for the Ministry.

The requirement to handle extremely toxic samples and chemicals, the need to provide more comprehensive analytical support, and an expanded provincial Fish Contaminant Monitoring Program necessitated the conversion of a staff cafeteria at the Resource Road complex into a

pesticide analytical development laboratory. Although construction of this unit seriously interfered with the work of the Pesticides Section, the acquisition of a computerized and automated gas-chromatographic analytical system mitigated its effects on laboratory output.

The north wing of the old laboratory building was also renovated in order to relocate the laboratory staff from 880 Bay St., Toronto. Completion of this transfer ended four years of planning, building renovation, and work integration.

Development

In conjunction with the eight per cent increase in regular workload, an increasing demand for diagnostic-type services and investigative work created additional challenges. Analytical method development work continued, and the laboratory quality control program was reinforced and integrated into the entire analytical process. Continuing stress on automating laboratory analytical processes resulted in higher productivity, increased efficiency, and improved data quality.

Method Development

It was most important that new techniques and methods were developed and brought on-line during the year. The three main objectives were:

- (1) to increase productivity and efficiency (automation and computer application);
- (2) to widen the spectrum of analyses (application of new methodology);
- (3) to improve analytical characteristics such as detection limit, sensitivity, precision, and accuracy (improved extraction, separation, and detection techniques, etc.).

Only a few manual procedures remain in the Water Quality laboratory where the manganese, ammonia, and total organic carbon tests were automated. Increased automation and computer control reduced the crew in the mercury laboratory from five people to three people. Spectrographic analysis is being further computerized. A fully-computerized spectrometer purchased at the end of the year will extend the application and output of the lab emission spectrometry analytical capability. Determination of trace elements by X-ray fluorescence was increased, and lead-testing with this technique was automated.

The determination of anions usually presents more problems than the analysis of trace metals. A Dionex ion exchange chromatograph was purchased and used for anion method development with satisfactory results. This technique is also amenable to automation.

Organic analysis was further automated. Haloforms in drinking waters were analyzed with an automated gas-chromatograph. A battery of four automated gas-chromatographs, directed by computer, conducted pesticide analyses. A bench-top gas chromatograph-mass spectrometer (GC-MS) system was added to instruments in the pesticide laboratory and applied to the identification of pesticides, PCBs, metabolites, and degradation products. GC-MS techniques were used to identify new organic pollutants. They were also combined with a sparging technique to scan biological materials such as fish tissue for volatile organics -- a one-day test that once took months to complete.

Methods were improved, developed, or adopted to: permit rapid and accurate determination of sulphur and chlorine in organic liquid wastes; to determine sulphur compounds in atmospheric samples; to speciate various forms of phosphorous compounds and complexes of trace metals; to identify petroleum hydrocarbon residues in drinking water.

A number of other methods were also modified. Hydrazine was introduced as a reducing agent in the nitrate method; the BOD technique was combined with the use of an automated oceanographic respirometer; a color determination method was developed which uses cobaltiplatinate standards; a GC technique to measure dissolved CO₂ was developed; a fluoride specific electrode was again investigated and recommended for low levels in water samples. Improvements made on the asbestos in water method permitted the publication of an interim procedure to be used in Ontario. Extensive study was carried out to establish the best sampling method and filtering media for asbestos in air. The Microbiology Section tested several media combinations to obtain the best recovery and identification of bacteria. The Section also started to develop facilities and skills to adopt the Ames test for the identification of mutagenic wastes and/or selectively isolated pollutants.

The Branch examined odour problems arising from the disposal of persistent organics and organic liquid wastes and developed several ad-hoc methods to identify offending compounds, including an odour kit for use in the field. The purging technique developed for fish analyses was used to determine odour and taste-causing substances in fish. To track down the sources of gasoline or fuel oil smells in drinking water, a positive tagging system was developed from compounds of the Musk family which permit detection of underground leaks of gasoline and fuel oil tanks.

Laboratory staff helped prepare a guide for the public which indicates, for most of Ontario's lakes, the degree of contamination to be expected in various fish species and illustrates which sizes of fish species may be regularly or intermittently consumed.

Quality Control

The Branch continued efforts to validate and record analytical methods. Systematic quality control became a regular part of analysis procedures for most parameters. Quality control results are kept separately and performance records prepared periodically. The effectiveness of quality control was demonstrated by excellent results obtained in inter-laboratory round-robin comparison tests initiated by the International Joint Commission and other agencies.

Data-handling for many tests was increasingly computerized which greatly reduced errors of manual registration, search, and handling. The "Guide to the Collection and Submission of Samples for Laboratory Analysis" was revised and published. Use of the booklet's guidelines reduces errors arising from faulty sampling techniques.

Shipping & Stores

The Toronto Central Laboratory handles shipping and storage functions for the Ministry. An inventory of 360 chemical, glassware, and miscellaneous stock items worth \$300,000 was maintained to provide support to field and laboratory activities. Over 280,500 bottles and supply items were shipped to field units and regional laboratories, and 460,000 bottles were processed by the Glass-washing Unit to ensure an adequate supply of sample bottles.

Safety Program

1977-78 was the first year in which the Laboratory and Research Complex had the services of a full-time safety officer. A comprehensive safety program was instituted that involved on-the-job safety training of employees, regular safety inspections of the complex, and the formation of a joint staff-management safety committee.

Other Activities

Laboratory personnel participated in a number of technical committees including several connected with the International Joint Commission and Canada-Ontario co-operative programs. In 1977-78, they presented 16 papers at scientific gatherings, had 17 papers published in technical journals, and prepared 148 technical reports.

A newsletter was started in 1977-78 to inform users of Laboratory Services about work conducted by the staff and developments in the field of environmental analysis. The publication was favorably received and should lead to more efficient use of available service.

finance and administration division

Executive Director: G.E. Higham

financial and administrative services branch

Director: W.D. Wood

As a result of the additional constraints imposed by Management Board, the Financial Services Branch was amalgamated with the Administrative Services Branch in October 1977 to become the Financial and Administrative Services Branch. At the same time, the Library Services Section was transferred to the Information Services Branch and the Cartography and Drafting Section was transferred to the Water Resources Branch.

Office Services Section

This Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, assets control, head office stockroom functions, the Policy and Procedures Manual, and telecommunications services. The Section also administers the Photocopier Control Program established by Management Board in August 1977.

Purchasing Unit

In spite of restraints, this Unit maintained a high level of service to clients within Anti-Inflation Board guidelines. During the calendar year, 1977, the Unit received 12,027 requisitions and issued 10,230 purchase orders for a total value of 27.8 million dollars.

Systems Development Section

This Section continued work on a wide variety of systems in conjunction with Ministry branches, including:

Air Resources Branch: The Air Quality and Meteorology Information System was modified and extended. The Automotive Emission System was revamped. An assessment of the information needs of the Nanticoke Environmental Management Project was initiated.

Water Resources Branch: The capabilities of the Sample Information System were extended. More water modelling techniques were added to their repertoire. Feasibility studies were conducted and requests for proposals for the development of a Limnology Information System and a Toxicity Information Monitoring System were prepared.

Pollution Control Branch: The Utility Water Pollution Monitoring System was developed, and an assessment of waste site information needs was initiated.

Environmental Approvals Branch: The Environmental Assessment Project Information System was implemented.

Project Co-ordination Branch: The capabilities of the Utility Project Management System were extended.

Laboratory Services Branch: Feasibility studies were conducted, and requests for proposals were prepared for the acquisition of mini-computers to handle the mercury in fish and microphotometer monitoring systems. The feasibility of developing an automated Laboratory Information System was reassessed with the result that a request for proposal was prepared for distribution to suppliers.

Regional Branches: A survey of data processing equipment and facilities was conducted in order to explore alternatives for facilitating program and data exchange between the regions and head office.

Financial and Administrative Services Branch: The Utility Rate Information System was improved and its capabilities extended.

The Ministry also conducted a broadly-based study that involved the assessment of existing information systems, documentation of future needs, establishment of priorities consistent with long-term Ministry plans, and development of a long-term information plan. Also studied were the closely related subjects of resource recovery requirements, organization, and service sources.

Systems Operation Unit

This Unit increased the size of its Remote Job Entry (RJE) Computer Terminal with the addition of a third printer and tape drive. A communications link with the Queen's Park Computer Centre was established.

The following new systems became operational this year: the Industrial Wastes System, the Utilities Monitoring System, and the RJE Accounting System. Modifications were made to the River Basins System and the Great Lakes System.

Capital Financing & Revenue Section

The Capital Financing and Revenue Section is responsible for the financial management of the Province's investment in water and sewage works projects, processing of claims under cost-sharing agreements, and acting as financial consultants to Ministry branches and municipalities.

In 1977-78, the Section provided financial, accounting, and reporting requirements for 460 projects under term-financing agreements and for 225 projects under long-term service agreements. These projects had a net investment value of \$880 million (\$1,062 million gross value) and generated revenues of \$62.5 million. The service agreements provide for periodic rate reviews of gallonage charges which recover the cost of financing and operation. During the year, the Section conducted 93 reviews and negotiated service rates with municipalities.

Section staff participated in the development of a new grant structure for water and sewage works and an agreement for a Waste Well Disposal project.

The Pollution Abatement Incentive Act was wound-up during the year. The table below shows the total grants provided during the life of the Act.

TABLE OF GRANTS

UNDER THE POLLUTION ABATEMENT INCENTIVE ACT

Fiscal Year	Appropriation	Claims	Actual Amount
1970/71	statutory	164	\$ 413,881
1971/72	2,000,000	559	1,944,889
1972/73	2,750,000	176	2,307,076
1973/74	3,750,000	249	1,571,963
1974/75	2,750,000	517	2,749,389
1975/76	3,250,000	564	3,242,125
1976/77	4,270,000	366	4,269,917
1977/78	1,840,000	213	1,839,357
TOTAL		<u>2,808</u>	<u>\$18,338,597</u>

Accounts Payable Section

This Section is responsible for the processing for payment of all supplier accounts, grants, subsidies, and travel claims. During the year a total of 71,000 batches of invoices were processed for budgetary expenditures amounting to \$113.5 million and 9,000 batches of invoices were processed for disbursements and charges amounting to \$137.6 million.

Accounting Records and Budget Control Section

This Section is responsible for providing a management information system, accounting records and budgetary control for all Ministry revenues and expenditures. In addition, the Section provides cashiering and cheque distribution services to the Ministry.

legal services branch

Director: J.N. Mulvaney, Q.C.

Legal Services staff are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any director whose decision under a statute is being reviewed in a hearing

before the Environmental Appeal Board or other review tribunal.

During 1977-78, the highest fine assessed under Ministry legislation was \$14,400 against York Sanitation Company Limited. In October 1977, the Branch was involved in the argument of The Queen vs. The City of Sault Ste. Marie before the Supreme Court of Canada. This was the first prosecution of a pollution offence to come before that Court, and it established new principles of law with respect to not only pollution prosecutions but also all offences under provincial statutes.

Other legal services included: acting as counsel in arbitration hearings under construction contracts, advising on the appropriate application of the Ministry's powers, and advising on the form of documents and orders which can be issued by directors under the legislation. The Branch also provides legal advice to the operating branches and prepares Orders-in-Council, regulations, contracts, and orders.

personnel services branch

Director: R.E.B. Burns

The implementation of a new manpower control program resulted in approximately 130 contract employees being appointed to the classified service. These employees had been employed by the Ministry for considerable periods. A continual monitoring of the new program based on dollars committed rather than on persons employed is to be carried out by the Staffing Section.

In the late fall of 1977, the affirmative action program was geared to a management-by-results plan. This committed managers to career planning interviews with individual female staff members with continued emphasis on training and development.

A new employee appraisal program was introduced to the Ministry; 240 staff attended 24 training sessions on "How to Conduct Employee Appraisal". This program, particularly with respect to the evaluation of management employees, is based on the evaluation of performance against pre-established goals.

The implementation of the compensation system known as "broadbanding" continued during the year. This system requires the Branch to ensure that those positions which are allocated to the broadbanding system are management positions as determined by the Crown Employees Collective Bargaining Act. It also requires the Branch to determine alternative allocations of some positions in bargaining unit classes.

The Branch formalized local and Ministry employee relations committees as provided for in the Collective Agreement between the Management Board of Cabinet and the Ontario Public Service Employees Union. Meetings were held at the Ministry's head office and will be extended to regional offices, the Laboratory Services Branch, and the South Peel system during the upcoming year.

A Central Attendance Recording System (CARS) developed by the Civil Service Commission was introduced. This computerized attendance system will provide employees with quarterly reports as to their attendance and vacation credits and management with information concerning the financial consequences and impact of absences during the year.

Training and Certification Section

Training

During 1977-78, this Section conducted 23 courses and workshops on 49 occasions for 795 Ministry and 543 non-Ministry personnel. Thirty-one trainees came from other provinces. Principal effort was directed at training water and wastewater treatment plant operators; 30 per cent of the program was oriented to Ministry staff, municipal inspectors, and industry personnel. (See Table III, page 70.)

A training centre was established at the Ministry's Experimental Facility (OEF) Brampton, Ontario, incorporating classroom, laboratory, and workshop facilities. Most of the Section's future courses and workshops dealing with plant operations are to be conducted at that location.

Certification

Seventy-six Ministry staff were re-certified in the Identification of Opacities of Visible Emissions, while 17 staff members obtained initial certification.

Twenty trainees were certified as Noise Control Officers after completing Parts I and II of the Acoustics Technology Course, including eight Ministry staff members, 11 municipal employees, and one industry representative.

Discussions were initiated with the Ontario Municipal Engineers Association on the development of a program for the voluntary certification of water and wastewater utility operators.

At year-end, the Training and Certification Section was transferred from the Personnel Services Branch to the Pollution Control Branch.

program planning and evaluation branch

Director: A. Castel

The Program Planning and Evaluation Branch conducts operational and policy evaluation studies relating to environmental planning, environmental control, resource recovery, and administrative support services. Primary goals are: 1) to ensure a rational allocation of available resources to programs, and 2) to assess program effectiveness and efficiency.

The Branch develops the annual estimates and acts as liaison with the Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

Implementation of Management-by-Results (MBR) involved completion of Phase I and establishment of performance monitoring procedures leading to an annual report for all operational programs.

Improvements to MBR programs already in use resulted in revised proposals for water and sewage works construction. Analysis of program options for Part VII of The Environmental Protection Act for private water and sewage will lead to revised program delivery.

Assessment of Ministry approval functions was completed.

Implications of the report from Policy Field on the impact of the Grants Reform Committee recommendation were evaluated with regard to Ministry programs.

During 1977-78, the Branch became increasingly involved in analysis of policies for capital expenditures. The job creation potential of Ministry programs in light of general economic conditions became an important assessment tool.

internal audit branch

Director: E.F. Heath

During 1977-78, the Internal Audit Branch carried out a comprehensive program of financial audits throughout the Ministry to evaluate:

- (1) the accuracy of Ministry records;
- (2) staff compliance with established and approved policies, guidelines, and procedures;
- (3) the effectiveness, efficiency, and practicability of the systems of internal controls designed to protect and safeguard the Ministry's assets, revenues, and expenditures.

The Branch conducted in-depth reviews in selected areas and monitored specific ongoing expenditure and revenue transactions on a continuing basis at the request of management.

The Branch performed audits with regard to:

- (1) revenues, expenditures, and disbursements including grants, bursaries, and financial transactions with other Ministries and outside agencies;

- (2) regional office operations;
- (3) the attendance reporting system and records.

The Branch also performed in-depth reviews in the area of recoverable and accountable advances, and continued to review new systems, procedures, and proposed controls with the staff of other branches.

information services branch

Director: R.J. Frewin

The Branch continued to provide a full range of communications and customer information services aimed at keeping the public informed of Ministry policies and activities.

In January 1977, the Branch assumed responsibility for co-ordination of the communications campaign supporting Ontario's ongoing fish testing program conducted by Environment Ontario, the Ministry of Natural Resources, and medical advisers of the Ministry of Labour's Occupational Health and Safety Division.

Five booklets containing the analyses for possible contaminants in fish from more than 450 Ontario water bodies were published and made available to the public in April 1978. In order to keep the public informed of current test results as these were completed, and prior to publication of the annual compendiums, 12 environmental bulletins were prepared and distributed on a monthly basis.

Since the information program got under way in the summer of 1977, more than 300,000 information pamphlets "Guide to Eating Ontario Sport Fish" and approximately 10,000 technical manuals containing complete test results have been produced and distributed.

For the third year Environment Ontario participated with the Ministry of Health and with local Officers of Health in a mosquito control program aimed at controlling the breeding of mosquitoes, a certain species of which has been identified as carriers of encephalitis virus. The joint information program is intended to advise householders of measures which they can undertake to prevent breeding of mosquitoes on their properties, and to inform them on recognizing the symptoms of the virus. More than 500,000 pamphlets, both French and English, were distributed and an extensive advertising and publicity campaign was mounted to inform the public about the government's control program.

Participating with Environment Canada, the Branch organized public meetings in Thunder Bay and Toronto in support of the Great Lakes Water Quality Board of the International Joint Commission and to stimulate interest and public input to the renewal of the 1972 Canada-United States agreement on water quality. The meetings were well attended and 50 briefs were presented by groups and individuals and later published as a record of these meetings.

Branch staff also co-ordinated media liaison and publicity activities on behalf of the 70th annual meeting of the International Air Pollution Control Association in Toronto which was attended by more than 4,500 delegates and members from all parts of the world.

The Branch also co-ordinated communications' activities on behalf of the Industrial Waste Conference; the York-Durham Water and Sewage Treatment Project; and the Metro Toronto Lead Committee and the Clean-up Program.

A highlight of the Branch's activities was completion of a documentary film, "Lake Odyssey", which narrates the Ministry's experimental weed harvesting program in the Kawartha Lakes. During the summer of 1978, a short version of the documentary was shown at commercial theatres in Toronto, St. Catharines, Hamilton, Peterborough, London, and Kingston.

The Ministry's educational program included the production and distribution of lesson plans for the teaching of environmental studies to 4,000 elementary and secondary school teachers and a comprehensive manual on environmental activities to more than 500 camp leaders.

Staff assisted in several major environmental teaching conferences and workshops during the year, including: sessions for teachers on professional days; an Ontario Camping Association workshop; a symposium on government education programs; and a Ministry-organized workshop for teachers of handicapped children.

The special "Envirovan" summer program included sessions at 48 provincial parks and at many children's camps at which environmental seminars were held.

The Branch provided support to the Ministry's six regions, including participation in 12 exhibitions and fairs, and official openings were staged for 12 new water and/or sewage treatment facilities completed during the year.

A new environmental arcade exhibit proved popular with approximately 800,000 visitors to Ministry displays at the Royal Winter Fair, at the CNE, Soo Conservation Week, Thunder Bay Exhibition, London's Western Fair, the Central Canada Exhibition in Ottawa, and the Pollution Control Show. The Ministry also participated in the Toronto Garden Show, the Plant Show, the International Plowing Match, the International APCA Convention, and the CNE.

Production of brochures and "Fact Sheets" was expanded, with 22 titles added to the number of publications available to the public, seven of which were in French. This brought the total number of publications distributed by the Branch to 102, of which approximately two million pieces were distributed during the year. "Legacy", the Ministry's bi-monthly newspaper, has grown to a circulation of 22,000.

A number of audio/visual shows were prepared as information support for a variety of Ministry programs and as documentaries.

Extensive photographic evidence and aerial photography work was provided for the Legal Services Branch.

During the year, administration of the Ministry's Library Section was transferred to the Information

Services Branch. The Library Section includes a major facility serving both Ministry staff and the public at our head office at 135 St. Clair Avenue West in Toronto, and a smaller facility which serves the central laboratory on Resources Road in Islington.

During the year the Library acquired 1,817 technical books and manuals, subscribed to and circulated 335 journals and periodicals, and conducted 519 computer searches for scientific data and information, mostly related to the work of our laboratories.

As part of the Ministry's customer information service, the central library responded to 9,650 reference questions, mainly from students at all levels; loaned 11,072 books and reports, circulated 17,506 journals and technical papers, and processed 53,963 photocopies of material for Ministry staff, other ministries, and the public.

boards and commissions

the waste management advisory board

Chairman: R.H. Woolvett

The Waste Management Advisory Board formulates policy and advises the Minister of the Environment on matters pertaining to the management of waste in Ontario. The Board places particular emphasis in its work on waste reduction, recovery, and recycling.

The Board consists of 11 members drawn from diverse backgrounds and locations across the Province. In 1977-78, the Board held 11 meetings totalling 20 days. Six committees also held 31 meetings to consider a wide range of waste management issues and programs.

At the Board's instigation, two industry working groups were formed: the Working Group on Waste Paper Utilization and the Industry Task Force Committee on Fluid Milk Packaging.

The 12-member Working Group on Waste Paper Utilization consists of representatives from paper producers, publishers, brokers, insulation manufacturers, municipal government, a paper union, and the citizen sector. It was appointed by the Board in January 1978. Purpose of the Group is to identify, develop, and assist in the implementation of processes, products, or systems that will increase the use of waste paper in Ontario, while bringing real savings and/or economies to agencies implementing such programs.

The Industry Task Force Committee on Fluid Milk Packaging was formed, at the request of the Board, by the Ontario Dairy Council and the Retail Council of Canada. The Committee is to review all packaging presently used

for the sale of fluid milk in Ontario and to oversee the development of a family of generic refillable milk containers.

The Board also initiated and/or completed:

- (1) urban solid waste generation studies, including Report No. 1 of the Waste Indices Committee (Urban Solid Waste Generation in Ontario), and Report No. 2 of the Waste Indices Committee (Solid Waste Management Cost Accounting and Monitoring Study);
- (2) general packaging investigations including the development of environmental guidelines for packaging of consumer products, the evaluation of environmental characteristics of packaging materials, and the identification and selection of packaging systems suited to standard reusable applications;
- (3) residential source separation studies, including the assessment of significant source separation programs, a home composting pilot project (Phase I), and the design of practical low-cost home composting devices;
- (4) paper recovery projects, including development of an implementation manual on office paper recovery and a methodology for systematic data collection on waste paper markets;
- (5) an environmental impact study of fluid milk containers;
- (6) a study of wine and spirits packaging in Ontario;
- (7) a study on the recovery and use of waste motor oil;
- (8) an investigation of waste management practices in selected government ministries and agencies;
- (9) carbonated soft drink packaging investigations, including an evaluation of the employment impacts for seven policy alternatives, the development of standard soft drink containers,

and a study on the impacts of standard refillable soft drink bottles;

- (10) a non-carbonated soft drink container study.

the environmental assessment board

Chairman: D.S. Caverly

The Environmental Assessment Board conducts hearings under The Environmental Assessment Act, The Ontario Water Resources Act, and The Environmental Protection Act. The Board also conducts hearings from time to time regarding environment-related matters at the direction of the government through Orders-in-Council.

Under the direction of a full-time chairman, the Board is composed of part-time members from various walks of life across the Province. The appointment in 1977 of S. Montgomery, a farmer from Hawkesbury, and G.J. Stopps, a medical doctor with the Department of Preventive Medicine and Biostatistics at the University of Toronto, brought the total strength of the Board to 16 members.

During 1977-78, the Board held ten hearings under The Ontario Water Resources Act and 14 hearings under The Environmental Protection Act. The Board also continued a hearing, as directed by two Orders-in-Council, concerning uranium mine expansion in the Elliot Lake Area. This hearing is expected to conclude in 1978-79.

On February 22, 1978, an Order-in-Council was passed authorizing and directing the Board to conduct a hearing regarding a proposal to burn polychlorinated biphenyls.

(PCBs) at the St. Lawrence Cement plant in Mississauga. The hearing is expected to commence late in the fall of 1978.

the pesticides advisory committee

Chairman: Dr. D.N. Huntley

The Pesticides Advisory Committee annually reviews The Pesticides Act, its Regulations, and government publications concerning pests and pesticides. The Committee also enquires into matters concerning pesticides and the control of pests as deemed necessary or as prescribed by the Regulations.

In 1977-78, the Committee consisted of 16 members representing agriculture, industry, universities, and government. Several membership changes took place. Mr. P.M. Lindley, an able member of the Committee since its establishment, resigned in December 1977. Two new members, Dr. R. Dorland, Ministry of Health, and Mr. A. Gartner, Utopia, Ontario, were appointed by Order-in-Council.

The Committee recommended several changes to Ontario Regulation 618/74, reviewed and evaluated the environmental impact, toxicity, and hazard of 11 new pesticide-active ingredients; reassessed four previously-classified compounds; evaluated 220 newly-registered pesticide products and recommended for each a classification for storage, sale, and use in Ontario. Amended guidelines for federally 'Restricted' pesticide products were established, and products affected were reclassified. A number of investigations were carried out including the

use of D.D.T. for the control of mice and bats, and recommendations were made to the Ministry. A report by the Committee on personal protective equipment for pesticide users released in 1975 was updated and published in November 1977.

The Committee continued a research program established in 1973 with three major objectives:

- (1) to find alternative pesticides for those deemed environmentally-hazardous and those restricted in use;
- (2) to determine potential environmental hazards with pesticides currently in use;
- (3) to reduce pesticide input into the environment.

The Committee received 35 research proposals, 20 of which were funded by the Ministry through the Committee at a total cost of \$195,940. A two-day research seminar was held in January 1978 at which fund recipients presented progress reports. An assessment of pesticide research projects funded through the Committee was prepared and submitted to the Ministry.

All 1977-78 publications of the Ministries of Agriculture and Food, Environment, and Natural Resources, concerned with pesticides were reviewed and endorsed prior to printing and distribution.

the environmental appeal board

Chairman: I.W. Pasternak, Q.C.

The Environmental Appeal Board provides an appeal forum for persons affected by certain decisions made by

the Ministry of the Environment or local health units. It consists of seven part-time members, including the Chairman, from various occupations and parts of the Province.

In 1977-78, the Board received 49 Notices of Appeal and held 32 Hearings in various locations in Ontario. The majority of the appeals concerned decisions of the Ministry or local health units on private sewage systems. The remaining appeals resulted from Ministry decisions regarding a waste disposal site, sewage and water works, and the emission of contaminants into the environment from several mines and from a rail-spill.

The Board resolved the 27 appeals from the previous fiscal year and dealt with 35 of the 49 appeals received in 1977-78. Decisions remain to be issued or hearings held on the remaining 14 appeals.

the pesticides appeal board

Chairman: J.R. Swanborough, Q.C.

The Pesticides Appeal Board provides an appeal forum for persons affected by Ministry decisions under The Pesticides Act, regarding the licensing of pest control operators and exterminators, and the use and control of pesticides. It consists of a part-time chairman and six part-time members.

The Board received only two Notices of Appeal in 1977-78 as compared to 22 Notices of Appeal in 1976-77. One of the two appeals was later withdrawn; the other was scheduled to be heard in April 1978.

The Board issued decisions on 11 outstanding appeals from the previous year.

the farm pollution advisory committee

Chairman: Otto Crone

The Farm Pollution Advisory Committee is comprised of four farmers. Its concern is to provide objective assessments of farm environmental situations. When requested by Ministry officials, the Committee visits farms to investigate complaints and makes recommendations that should be employed regarding manure storage, spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

The Committee visited four farms in 1977-78: two hog farms, one beef farm, and one chicken broiler farm.

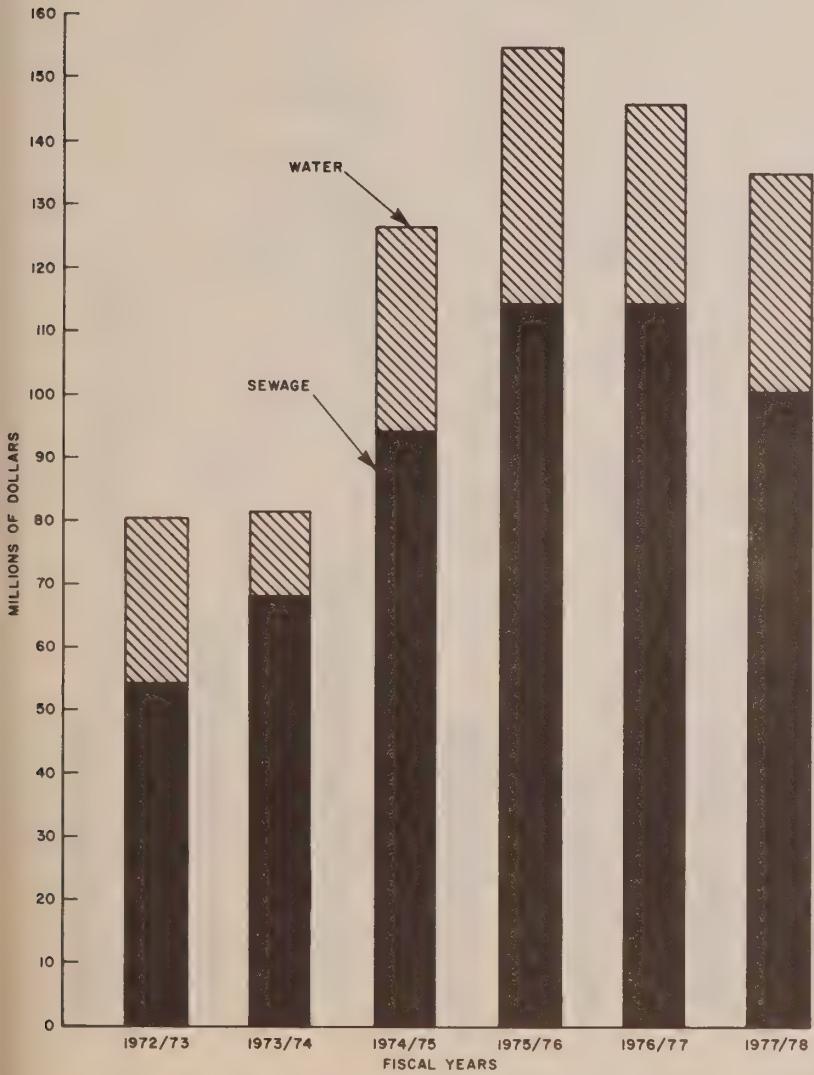
Concerning one hog farm, the Committee had one recommendation regarding drainage, and the owner agreed to comply. The Committee found the other hog farm to be poorly operated and made several recommendations. The owner indicated, however, that he was selling the farm, and the new owner would be changing it to a white veal operation. Follow-up will be required by the Ministry.

The beef farm is a very large feedlot. It produces some odour but is being operated in good fashion. The chicken broiler farm is operated in an excellent manner and cannot be improved upon.

appendices

ANNUAL TOTAL EXPENDITURE BY PROJECT TYPE (1972/73 - 1977/78)

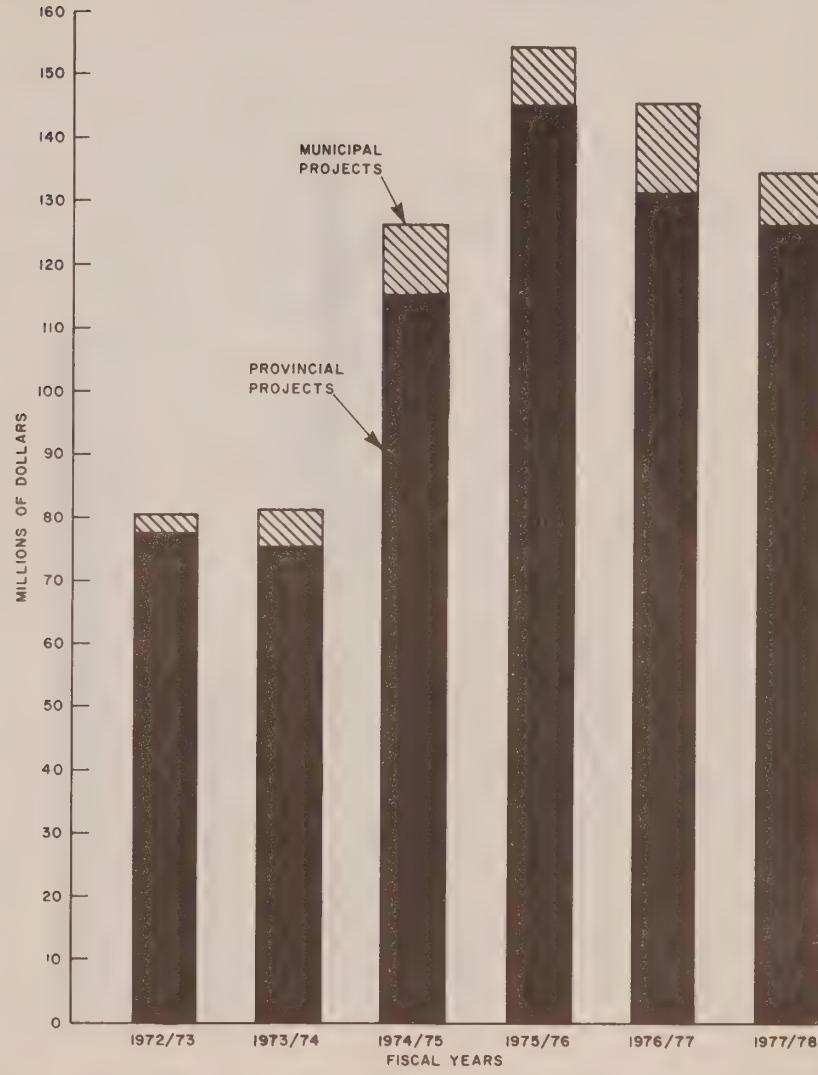
Source: Project Co-ordination Branch



GRAPH I

ANNUAL TOTAL EXPENDITURE BY CLASS CAPITAL CONSTRUCTION PROGRAM (1972/73 - 1977/78)

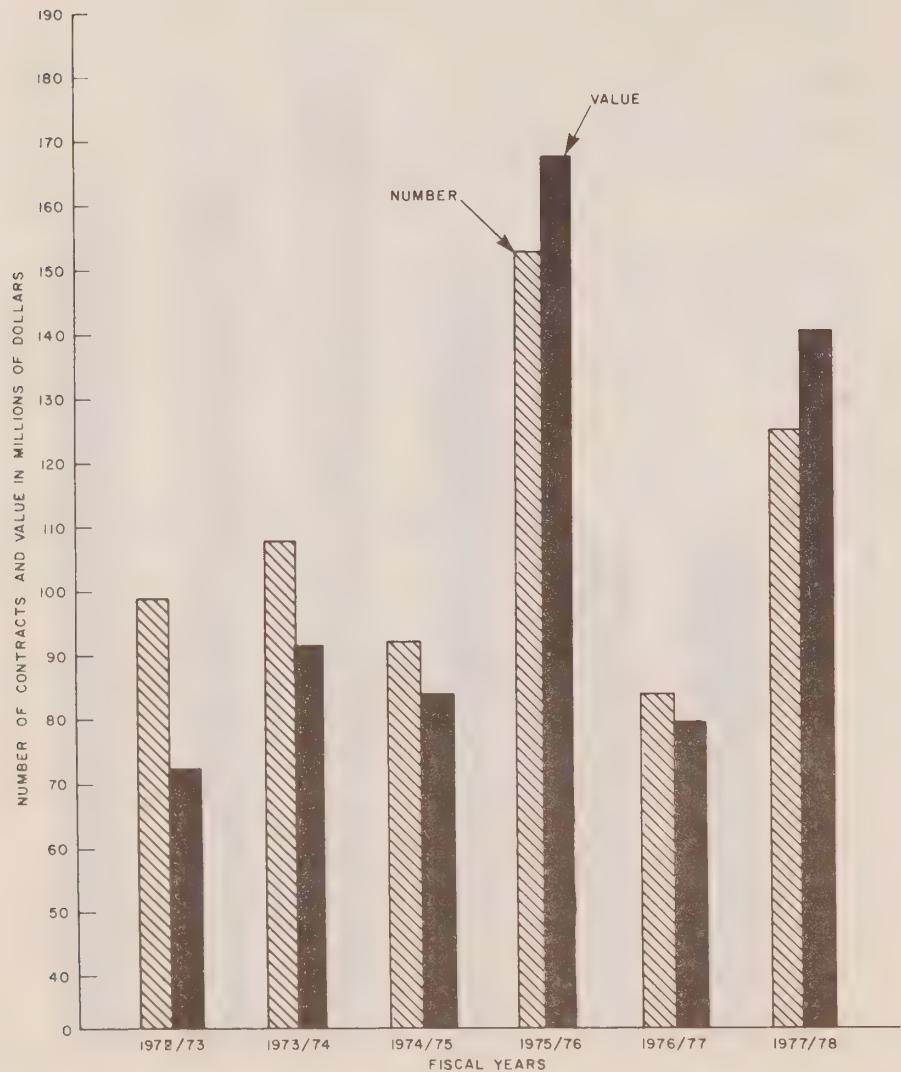
Source: Project Co-ordination Branch



GRAPH II

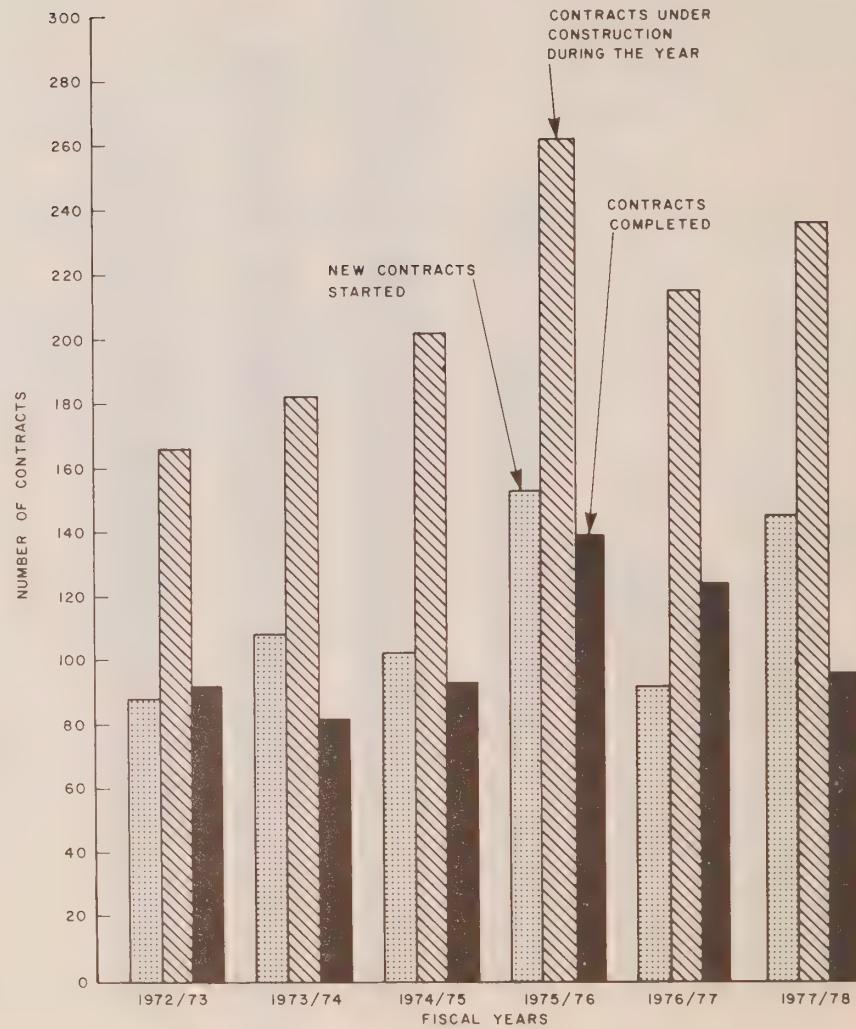
NUMBER AND VALUE OF CONTRACTS TENDERED ANNUALLY
(1972/73-1977/78)

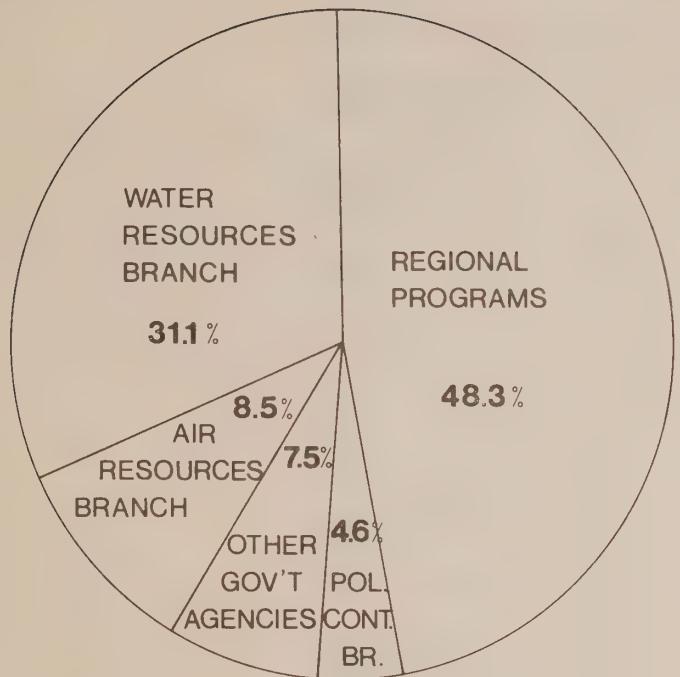
Source: Project Co-ordination Branch



ANNUAL VOLUME OF ACTIVITY
(1972/73-1977/78)

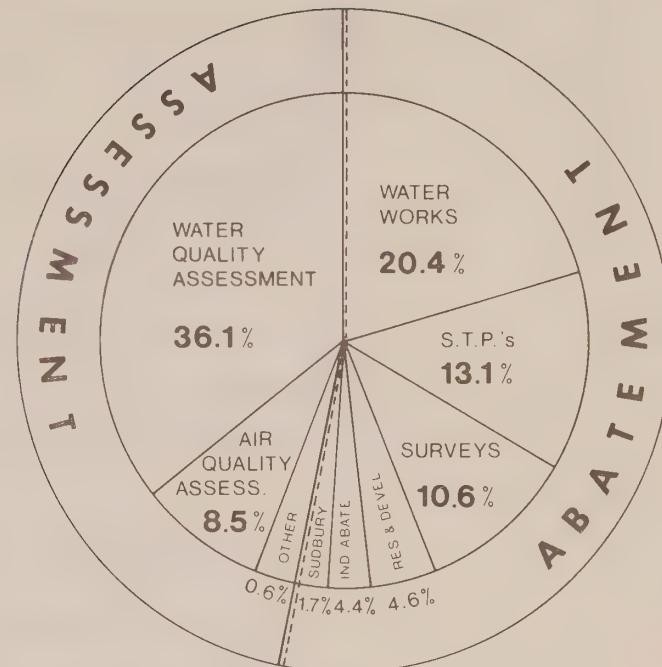
Source: Project Co-ordination Branch





TEST LOAD DISTRIBUTION 1977/78

GRAPH V



TEST DISTRIBUTION BY PROGRAM 77/78

GRAPH VI

Source: Laboratory Services Branch

Source: Laboratory Services Branch

TABLE I

PROJECT CO-ORDINATION BRANCH

Volume of activity under Capital Construction Program during 1977-78:

1) Capital Expenditure	\$ 135,085,000
Sewage Works	\$ 100,994,000
Water Works	\$ 34,091,000
Provincial Projects	\$ 126,962,000
Municipal Projects	\$ 8,123,000
Provincial Subsidy	\$ 57,410,000
% of total expenditure	% 42.5
2) Construction	
Contracts Tendered - No.	125
- \$ Value	\$ 140,484,000
Contracts Started - No.	145
- \$ Value	\$ 139,296,000
Contracts Completed - No.	96
- \$ Value	\$ 103,847,000
Contracts Under Construction During the Year	236
Average Number of Contracts Under Construction in each month	127
3) Grants to Regional and Restructured Municipalities	
No. of Municipalities Participating	14
Value of Grants Paid	\$ 20,350,000

TABLE II
TESTS PERFORMED, 1977-78

LABORATORY	1976-77	1977-78	Change %	% of Total	
	Tests x 1000	Tests x 1000		1976-77	1977-78
Toronto Laboratory					
Water Quality	774	754	- 2.6		
Air Quality	255	299	+17.3		
Organic Trace Cont.	36	49	+36.1		
Pesticides	70	103	+47.1		
Physical Methods	-	15	NA		
Microbiology	137	140	+ 2.2		
TOTAL TORONTO LAB.	1,272	1,360	+ 6.9	77.1	76.4
London	182	200	+ 9.9		
Thunder Bay	92	84	- 8.7		
Kingston	104	136	+30.8		
TOTAL REGIONAL LABS.	378	420	+11.1	22.9	23.6
TOTAL LAB. SERVICES BR.	1,650	1,780	+ 7.9	100.0	100.0

NA = non applicable

TABLE III
TRAINING & CERTIFICATION SECTION
STUDENT INTAKE

April 1977 - April 1978

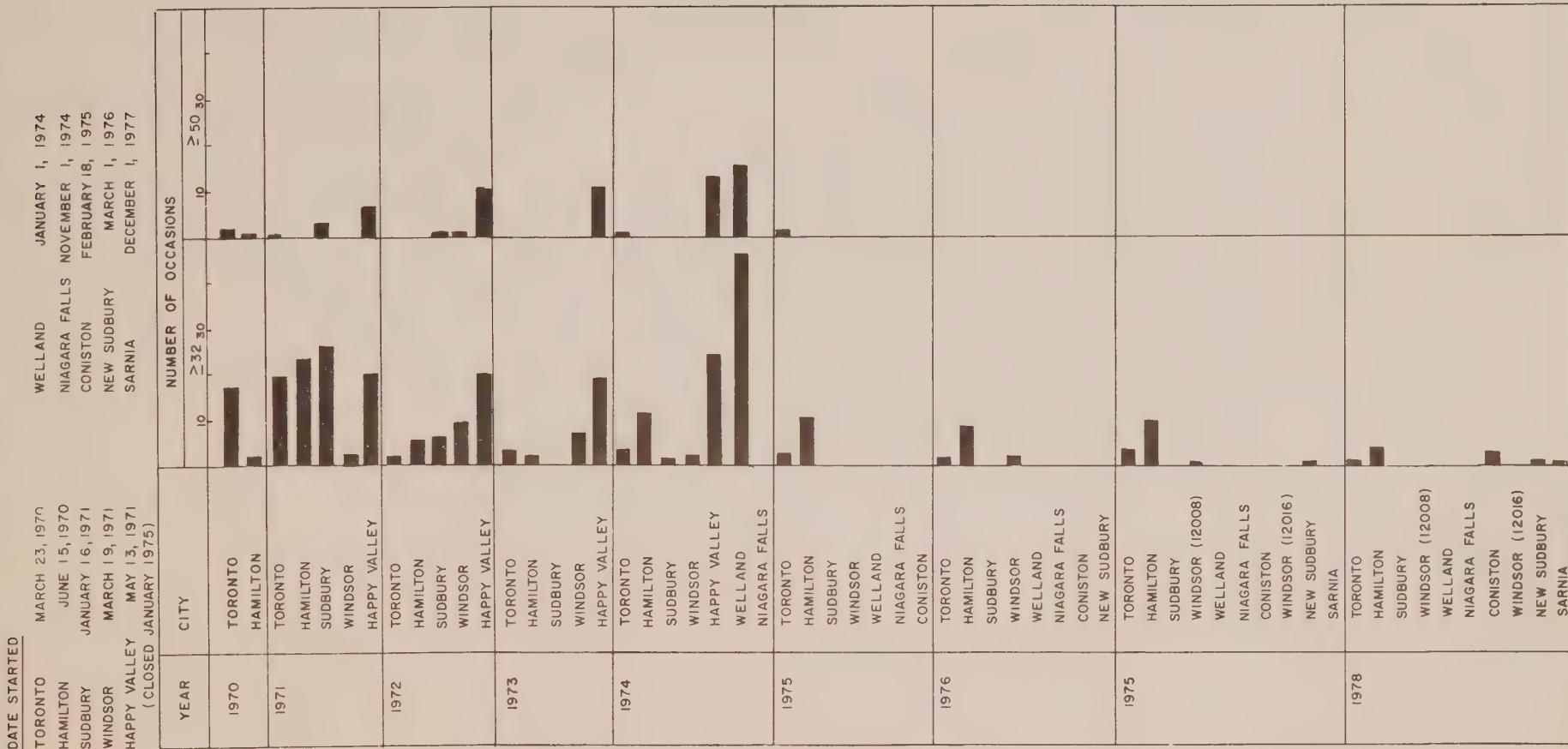
<u>NO. OF COURSE</u>	<u>COURSE</u>	<u>MOE</u>	<u>MUN.</u>	<u>IND.</u>	<u>O/S PROV.</u>	<u>TOTAL</u>
1	Acoustics Technology I	11	9	1	-	21
1	Acoustics Technology II	7	11	1	1	20
1	Acoustics Technology III	4	12	1	1	18
1	Land Use Planning	18	29	17	1	65
2	Activated Sludge Workshop	55	50	-	5	110
5	Basic Gas Chlorination	39	65	5	3	112
5	Basic Sewage Treatment	52	56	9	2	119
4	Basic Water Treatment	25	37	2	4	68
2	Construction Inspectors	2	59	23	5	89
1	Industrial Air Abatement	15	-	-	-	15
1	Maintenance Gas Fitters	7	5	-	-	12
3	Preventive Maintenance	24	37	-	1	62
3	Primary Treatment	33	14	-	-	47
3	Pump Operations Workshop	28	35	-	1	64
1	Sewer & Watermain Design	2	32	20	-	54
6	First Aid Course	64	3	-	-	67
1	Gas Testing	50	-	-	-	50
2	Surface Water Treatment	25	12	-	2	39
1	Visible Emissions	76	-	-	1	77
1	Monitoring Water/Wastewater	33	3	-	4	40
1	Water/Sewage (Kingston)	18	-	-	-	18
1	Water/Sewage (Niagara)	-	15	-	-	15
1	Law Enforcement Course	157	-	-	-	157
	TOTAL:	49	484	79	31	1,339

OUTSIDE PROVINCE REPRESENTATION

Acoustics	- Edmonton	Monitoring Water	- N.S.; P.E.I.
Land Use Plan	- Saskatchewan	Activated Sludge	- B.C.
Basic Gas	- Halifax; B.C.	Construction Inspectors	- N.S.
	- Winnipeg	Preventive Maintenance	- N.W.T.
Basic Sewage	- Winnipeg	Pump Operations	- B.C.
Basic Water	- Halifax; N.W.T.	Surface Water	- B.C.; P.Q.
		Visible Emissions	- Alberta

Source: Personnel Services Branch

TABLE IV
ONTARIO'S AIR POLLUTION INDEX



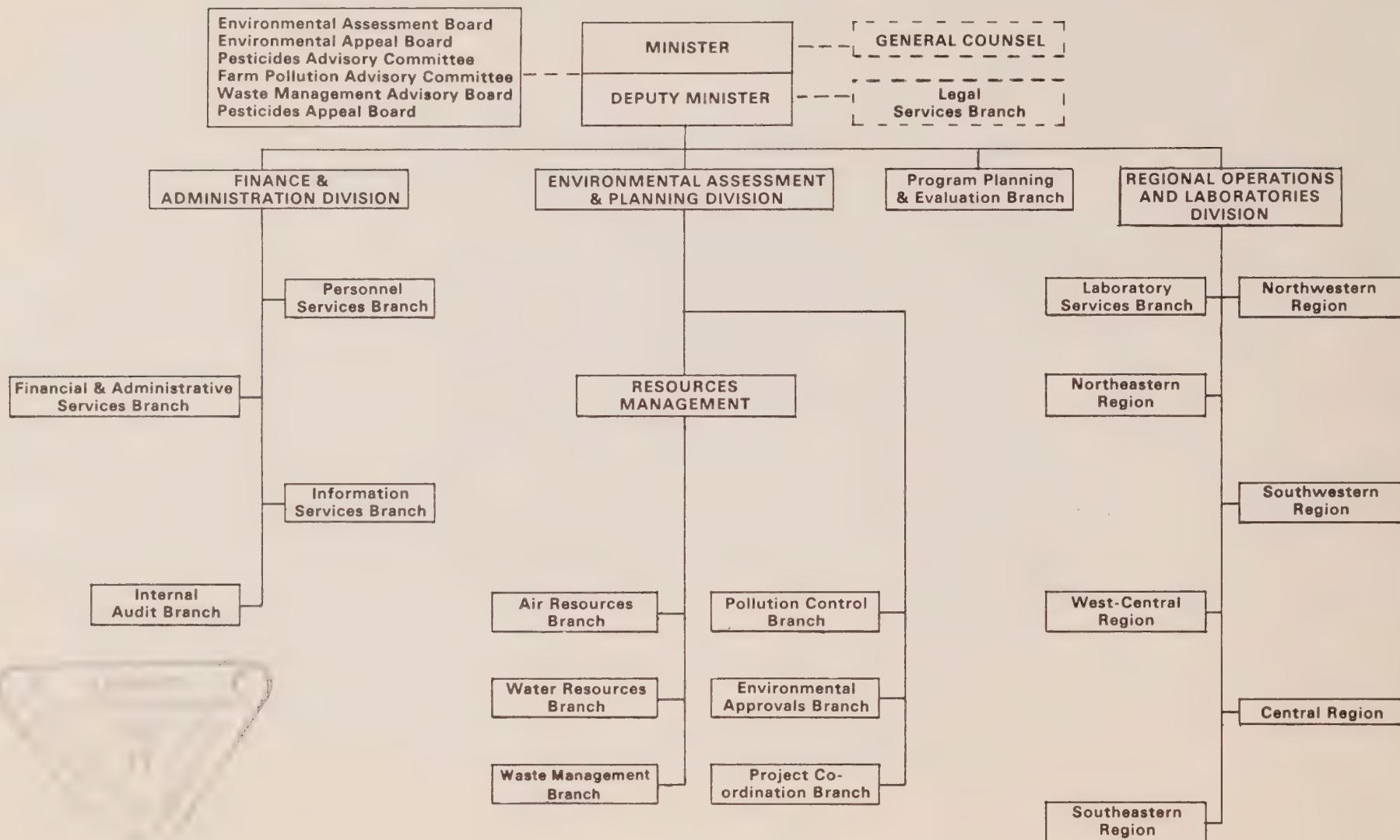
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Ministry of the Environment

Annual Report 1978-79

MINISTRY OF THE ENVIRONMENT—AUGUST 1, 1979



contents

DEPOSITORY LIBRARY MATERIAL

Organization Chart		
Letters of Transmittal	Frontispiece	49
Goals and Achievements	2	49
Environmental Assessment & Planning Division		
Air Resources Branch	7	49
Water Resources Branch	7	49
Pollution Control Branch	10	50
Environmental Approvals Branch	17	50
Project Co-ordination Branch	21	50
Waste Management Branch	23	51
	26	51
Regional Operations and Laboratories Division		
Northwestern Region	29	52
Northeastern Region	29	52
Southwestern Region	31	52
West-Central Region	32	52
Central Region	34	52
Southeastern Region	35	52
Laboratory Services Branch	37	52
	38	52
Finance and Administration Division		
Financial and Administrative Services Branch	43	53
Legal Services Branch	43	53
Personnel Services Branch	45	54
Program Planning and Evaluation Branch	45	54
Internal Audit Branch	46	55
Information Services Branch	47	55
	47	56
Boards and Commissions		
The Waste Management Advisory Board		
The Environmental Assessment Board		
The Pesticides Advisory Committee		
The Environmental Appeal Board		
The Pesticides Appeal Board		
The Farm Pollution Advisory Committee		
The Royal Commission on the Northern Environment		
	52	52
Appendices — Charts and Tables		
Annual Total Expenditure by Project Type 1978-79		
Annual Total Expenditure by Class. Capital Construction Program 1978-79		
Number and Value of Contracts Tendered Annually 1978-79		53
Annual Volume of Activity		54
Production, Central and Regional Laboratories		54
Tests Performed 1978-79		55
Table III — Student Intake, Training & Certification Section — 1978-79		55
Table IV — Ontario Air Pollution Index Average Readings		56



To:

The Honourable
Harry C. Parrott, D.D.S.,
Minister.

Sir,

I have the honour to submit
for your approval the annual
report of the Ministry of
the Environment for the year
1978-1979.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Graham W.S. Scott".

Graham W.S. Scott,
Deputy Minister



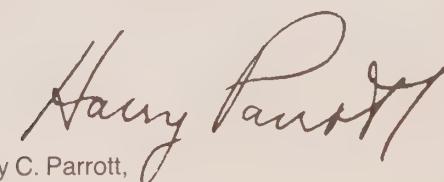
To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1978, and ending
March 31, 1979.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Harry C. Parrott".

Harry C. Parrott,
Minister

The Honourable Harry C. Parrott, D.D.S., was appointed Ontario Minister of the Environment on August 18, 1978, transferring from his former portfolio as Minister of Colleges and Universities, an office he held since October 7, 1975.

The Honourable George R. McCague served as Minister of the Environment from January 21, 1978 to August 19, 1978, when he was appointed chairman of the Management Board of Cabinet.

goals and achievements, 1978-79

Ontario's pioneering commitment to environmental protection has resulted in the development of legislation, research programs, and policies which have made the Province a recognized leader in the environmental field.

The Ministry was established in 1972 to consolidate responsibility for all aspects of environmental protection, enhancement, and restoration under one agency of the Ontario Government. The operating legislation of the Ministry includes legislation which established previous agencies and now comprises:

- The Ontario Water Resources Act, 1970
- The Environmental Protection Act, 1971
- The Pesticides Act, 1973
- The Environmental Assessment Act, 1975

Goals

To provide the 8.5 million residents of the Province with effective environmental management, Environment Ontario has set four major, long-term objectives:

- to control contaminant emissions;
- to establish environmental safeguards to protect human health and the natural environment;
- to manage Ontario's water resources and to manage waste;
- to develop and maintain measures to preserve, restore, and enhance the natural environment.

Achievements

During 1978-79, the Ministry advanced toward its goals on many fronts. The activities and achievements of Ministry programs are reported by Divisions, Operating Branches and Regions, and include the following highlights of the year's progress:

Environmental Health

The Ministry continued its major co-ordinating role in the Fish Testing Contaminants Program—including responsibility for fish testing and dissemination of public information—in co-operation with the Ministry of Natural Resources and with medical advisors of the Occupational Health and Safety Division of the Ministry of Labour. During 1978-79, about 13,000 fish, weighing approximately six tons, were analyzed for trace contaminants. To date, over 43,000 fish have been analyzed. Three publications containing comprehensive guidelines on the consumption of sport fish from 625 Ontario lakes and waterways were published and made available to the public in April 1979.

The asbestos monitoring program continued testing of municipal water supplies to safeguard public health. Tests made during the year were low or at the detection limit for asbestos fibres.

Twenty-two health-related environmental research projects were approved for funding through the Provincial Lottery Trust Fund at a total cost of \$1.9 million.

The Mosquito Control Program undertaken in co-operation with the Ministry of Health contributed to successful control of mosquito populations for the third consecutive year. No human cases of encephalitis were reported during 1978-79.

Environmental Protection

In October 1978, the Minister announced a seven-point action plan to deal with the growing problem of liquid industrial waste:

- 1) Development of a plan to establish need, timing, location and provincial involvement in waste treatment facilities;
- 2) Guidelines for industry which call for an end to direct landfilling of certain liquid wastes and the disposal of wastes requiring special handling in perpetual care sites;
- 3) A review of interim storage needs for such wastes as PCBs and the possible development of secure storage sites by government;
- 4) Classification of wastes in terms of treatment and disposal requirements;
- 5) Long-term regulations specifying disposal methods for various classes of wastes, mandatory registration of wastes by producers, and establishment of a fund to provide perpetual care of special disposal sites;
- 6) Continued streamlining of the Ministry's automated way-bill system which tracks wastes from producer to disposal; and
- 7) Continuing discussion with federal, provincial and the U.S. governments to ensure free movement of wastes across provincial and national boundaries to safe disposal facilities.

Great Lakes Agreement

A new agreement re-affirming the commitment made by Canada and the U.S. in 1972 to restore and enhance Great Lakes water quality was signed in Ottawa in November, 1978. The new agreement terms included

tighter controls on the discharge of toxic substances; new phosphorus loading targets and deadlines by which municipal and industrial pollution abatement programs are to be completed; revised water quality objectives including one for radioactivity.

Review of Ministry Activities by the Standing Committee on Resources Development

On September 13, 1978, the Ontario Legislature approved a motion requiring the Standing Committee on Resources Development to "include in its consideration of the annual report of the Ministry of the Environment the following matters: ". . .the abatement program governing INCO in Sudbury; the pollution control measures imposed on the pulp and paper industry; and the global phenomenon known as acidified precipitation."

Consideration of the matters began on February 5, 1979 and continued through 18 sittings until February 16, 1979. The Committee heard testimony from the Minister and staff of the Ministry of the Environment, scientific experts from the federal government and Ontario universities, representatives of public interest groups and executives of the International Nickel Company.

Energy Recovery

Refuse derived fuel burning facilities at Canada Cement Lafarge, Woodstock, were completed and trial runs were carried out using RDF produced at the Ontario Centre for Resource Recovery, Downsview, in preparation for a full-scale demonstration to start early in 1979-80.

New Service Systems

During the year, the Ministry handled 249 construction contracts for sewage and water treatment systems across the Province and administered a capital expenditure of approximately \$147 million. Ten new facilities were put into operation.

The construction of 70 miles of trunk sewer and the 160 million gallon per day sewage treatment plant for the York-Durham project was on schedule for the target opening in 1980, the biggest single servicing project ever undertaken by the Ministry.

Under terms of a new agreement between the federal and provincial governments, Ontario became responsible for administering federal grants previously administered by the Central Mortgage and Housing Corporation to assist construction of water and sewage services.

Monitoring and Sampling

A new mobile laboratory, TAGA 3000, was acquired in February 1979 to improve the Ministry's capability of performing sophisticated tests for contaminants more rapidly.

Extensive air monitoring surveys were undertaken in Mississauga, Hamilton, Welland, Nanticoke, Espanola, Sault Ste. Marie, Thunder Bay, Red Rock, Marathon and Sarnia.

Wind trajectory analyses were carried out as part of the studies of acidic precipitation in Central Ontario. The data indicated that much of the problem results from the long-range transportation of acidic compounds emitted in industrial areas south of Ontario.

The Toronto and regional laboratories performed over 1.7 million tests during the year, with increasing emphasis on the testing of air, water and land samples for hazardous substances.

Water Management

Expanded and updated information on the management of surface and ground-water quality and quantity was issued in a new publication: "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment".

Recreational Lakes

Acidic precipitation emerged as a major program in 1978 following the first Ministry reports on the problem in 1977. Detailed field studies were undertaken on approximately 20 lakes in the Muskoka-Haliburton area to determine the extent of the problem. In addition, a research contract was awarded to a consultant to study possible effects of acid rain on the mercury content of sport fish. This work is to be completed in 1979-80.

Environmental Assessments

During the year, environmental assessments were formally submitted for the first time by several governmental agencies. Among the 16 submissions were those dealing with highway widenings (Ministry of Transportations and Communications); the Colonel Samuel Bois Smith Waterfront in Etobicoke (Metro Toronto Regional Conservation Authority); access roads (Ministry of Natural Resources); the Highway 89 extension from highway 400 east to Highway 12 (Ministry of Transportation and Communications); major transmission lines, transformer stations, and new communication towers (Ontario Hydro); expansion of the Welland Water Treatment Plant (Ministry of the Environment); solid waste disposal (Ministry of Natural Resources); the Haldimand-Norfolk regional water supply scheme (Ministry of the Environment).

Environmental Studies

Major environmental studies continued at Nanticoke, Sudbury, Elliot Lake, Port Granby and elsewhere. The Nanticoke Environmental Management Program (NEMP) was established as a joint undertaking of the Ministry with Ontario Hydro, Environment Canada, Texaco, and the Steel Company of Canada to ensure maximum environmental safeguards when the huge industrial, chemical, and hydro complex becomes fully operational. The site will be one of the most thoroughly and intensively monitored areas in the world to ensure a clean environment.

Environmental engineering reviews and approvals were continued on major Ontario Hydro projects, and submissions presented to the Royal Commission on Electric Power Planning, including Ministry views on significant environment policy matters related to nuclear plants.

Contaminants Research

The Ministry's Hazardous Contaminants Program was expanded, and significant findings obtained through research and surveys conducted by the Hazardous Substances Committee's four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. The Committee is inventoring industrial establishments in the Province to determine the use and handling of a selected number of chemicals which could have a hazardous reaction on health or the natural environment, and is working in close liaison with Environment Canada.

Pulp and Paper Industry

A major review was completed for the 31 pulp and paper mills which discharge directly into Ontario watercourses. Of these, ten had completed pollution abatement programs to

satisfy current Ministry requirements; three were working on schedule on voluntary control programs and the balance were under compulsory control orders.

New policies were adopted to shorten the time frame for completion of abatement programs—including new financial grants and more rigorous enforcement programs.

The Ministry also served notice on Reed Ltd., of a new control order to be issued for their Dryden Mill.

Appointments

Graham W. S. Scott, formerly Associate Secretary of the Cabinet and Secretary of the Policies and Priorities Board of Cabinet, assumed responsibility as the new Deputy Minister of the Environment in February 1979. Mr. Scott is a lawyer whose former positions include being Executive Assistant to the Leader of the Opposition, Ottawa.

Organization

The Waste Management Branch was established on August 1, 1978 in order to bring all head office functions related to the management of solid, liquid and hazardous wastes within one organizational structure. Elements of the Pollution Control Branch and the Resource Recovery Branch were regrouped to achieve this goal.

In Appreciation

In February 1979, K. H. Sharpe, Deputy Minister of the Environment since April 1977 was appointed Chairman-designate of the Environmental Assessment Board, to succeed David S. Caverly (who remains a member of the Board) on June 1, 1979.

Mr. Sharpe originally entered the public service in 1947 with the Department of Health and served in a number of positions in the Ministry of the Environment and its predecessor, the Ontario Water Resources Commission.

Mr. Alan J. Harris, director of Air Resources Branch since 1974, retired in November, 1978. His career spanned 28 years with the Ministry and its predecessor agencies, the Dept. of Health and the Ontario Water Resources Commission.

The Ministry wishes to thank Mr. Sharpe and Mr. Harris for their many valuable contributions to environmental progress in the Province.

environmental assessment and planning division

Assistant Deputy Minister: J. W. Giles
Executive Director: W. B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

To serve as the central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation.

To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants.

And, to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

air resources branch

Director: T. W. Cross

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology, and recommendations concerning air quality criteria and standards.

Air Quality and Meteorology

The Air Quality and Meteorology Section maintains the Ontario air monitoring network, which included over 1400 air quality and meteorology instruments in 1978-79 and operated in approximately 100 areas. The network produced approximately three million data points that were computer processed and interpreted in published reports. The following pollutants were routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, total reduced sulphur, hydrocarbons, ozone, suspended particulate matter, dustfall, sulphates, nitrates, lead and other trace metals. Sulphation and fluoridation rates were also routinely measured.

The Air Pollution Index, the basis of Ontario's Alert System, continued to be publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, and Coniston.

Air quality modelling of the Sarnia-Port Huron area was conducted to develop a new

regulation limiting the emissions of sulphur dioxide from power and petrochemical plants south of Sarnia.

Wind trajectory analyses carried out for acidity in precipitation occurring in Central Ontario showed much of the acidity to result from the long-range transport of acidic compounds emitted in industrialized areas south of Ontario.

Studies were conducted to characterize the long-range transport of ozone into and across Southern Ontario during 1976, 1977 and 1978. Ozone episodes — i.e., widespread high concentrations of ozone of approximately twice Ontario's criteria — were primarily associated with warm, moist, south-southwest airflows advecting the pollutant from the United States into Ontario. Ontario's sources of nitrogen oxides and hydrocarbons add to the photochemical production of ozone downwind of major urban centres, thereby increasing levels above Ontario objectives.

Criteria Development and Program Planning

The Criteria Development and Program Planning Section established guidelines for ten new air contaminants and prepared detailed reports on three environmental assessments and two land-use changes. Section members also worked on four federally-organized task forces to produce federal regulations and guidelines for various industries.

Using the formal procedure developed previously for Ministry participation in the administration of federal regulations and guidelines in Ontario, the Section made recommendations regarding Ontario's course of action with respect to federal guidelines dealing with the cement industry.

The Section organized and presented a two-day seminar and workshop on air pollution for Ministry personnel.

At year-end, the Section, Southwestern Region, and related industry, were finalizing a new regulation for SO₂ emissions in the Sarnia area. During the year, the Section completed a detailed study of SO₂ emissions from the Texaco Port Credit refinery. Also provided was an air quality correlation investigation in support of the Sudbury environmental study.

Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 93 industrial and other sources in southern Ontario in 1978-79. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated 178 vegetation complainants from the public of which 46 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, regional managers, and the Board of Negotiation.

The Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit, and glass. The Section also investigated the effects of sulphur dioxide, lead, boron, ethylene, nickel, cobalt, and mercury emitted by various industries in southern Ontario. In the City of Toronto, soil, which had been replaced on residential properties adjoining several industries, was retested for lead content.

Biological monitors consisting of fluoride sensitive gladiolus plants were established in the vicinity of six industries to monitor at-

mospheric fluorides. Indicator plots consisting of plants selected to differentiate between effects caused by photochemical oxidants, sulphur dioxide, and ethylene were established. Networks of sphagnum moss bags were established in the vicinity of several industries to determine the degree and extent of heavy metal deposition.

During the 1978 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxy-acetyl nitrate) injury on white bean, tomato, and potato crops. Oxidant injury to crops was less severe in 1978 than in 1977.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco, and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 8,057 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology, and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation have been developed for 19 contaminants. The section conducted a number of research studies both in the field and in controlled-environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

A Phytotoxicology display on the effects of various contaminants on vegetation was shown at the Ontario Science Center in March 1979.

During 1978, five Phytotoxicology papers were published in scientific journals; twelve papers were presented to technical conferences; 21 extra-ministerial activities were undertaken by Phytotoxicology staff in con-

junction with provincial, national, and international committees and task forces.

Technology Development and Appraisal

The five units of the Technology development and Appraisal Section conducted a wide range of investigations in support of Air Management Branch activities in 1978-79.

The **New Technology Unit** keeps the Branch informed of technological developments in the process industries and in pollution control methods. In 1978-79, particular emphasis was placed upon the control of asbestos emissions and silicon carbide manufacturing processes. The unit also monitored and reviewed energy-related problems such as coal desulphurization and gasification; general control methods, including ways of reducing emissions of oxides, nitrogen, and sulphur dioxide; and methods of collecting suspended particulate emissions.

The Unit assisted other Branches and the Regions in assessing control equipment, resolving problems of ferrous foundries, and evaluating odour control problems. Responsible for comprehensive inventories of hazardous substances, the Unit initiated in-house inventories of 16 substances and completed the work involved for twelve of them.

A contract was awarded to Acres Consulting Ltd. in 1978-79 for the inventorying of 15 organic chemicals. By year-end, the first phase had been completed and a selection made for materials to be examined in greater depth. Work was also started on the design of a data handling system intended to produce reports summarizing inventory information for other Branches.

The **Monitoring and Instrumentation Development Unit** conducted extensive air monitoring surveys in Mississauga, Hamilton,

Welland, Nanticoke, Espanola, Sault Ste. Marie, Thunder Bay, Red Rock, Marathon, and Sarnia. In addition, spot surveys were conducted in Guelph, Kitchener, and Oakville. The unit acquired a TAGA 3000 mobile laboratory in February 1979 that will greatly enhance its capabilities. Extensive development was carried out on the Hewlett Packard 5830A gas chromatograph to meet an increasing demand for monitoring organic contaminants in ambient air.

The **Special Studies Unit** is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP) and the Sudbury Environmental Study.

Routine particulate, gaseous pollutant, and precipitation monitoring was started in the Nanticoke area with the selection of monitoring sites, instrument installation, and the contracting of network operations. A data base was set up for storage of NEMP network data, and data reporting procedures were finalized.

Mathematical modelling of short-and long-range Nanticoke air quality impacts advanced significantly with completion of a summertime fumigation model for the area. At year-end, the model was being interfaced with a real-time, data acquisition and processing system (DAPS) for possible use in a supplementary control system. A contract for setting up DAPS was awarded to Radian Corporation. The Unit conducted several intensive field studies in the Nanticoke area, including an investigation of lakeshore plume dispersion and airborne particulate composition.

The Unit continued the Sudbury Environmental Study (SES) meteorological measurements program with balloon soundings, solar radiation measurements, and smelter plume photography studies. The high-volume

sampler and monthly precipitation chemistry networks were expanded, and an event precipitation chemistry network was started. A dispersion study involving INCO's 391-meter stack was carried out in June 1978 under conditions when fumigation due to looing occurs. Particle-sizing and chemical composition measurements were performed, both on the ground and in the plume of the Falconbridge smelter.

The Unit continued development of long-term, short- and long-range mathematical models for assessing smelter emission impacts on the Sudbury area and farther afield.

The **Hazardous Contaminants and Research Planning Unit** is responsible for co-ordinating activities under the hazardous substances and the research grants programs. In 1978-79, the Unit completed documents on PAHs, aromatic and chlorinated hydrocarbons, and environmental radioactivity. The Unit also conducted surveys in Hamilton, Mississauga, and Sarnia to measure levels of aromatic and chlorinated hydrocarbons in ambient air. Approximately \$280,000 was distributed to 19 different groups under the Research Grants Program; a monitoring system was established to ensure maximum benefit to the Ministry from the program.

The **Source Assessment Unit** is responsible for co-ordination of source testing surveys, maintenance of high technical standards during source tests, writing of new source testing methods, updating of the Source Testing Code, and initiation of research on measurement methods. In 1978-79, the Unit continued emission surveys in the Sudbury basin, at coke ovens in Hamilton, and at automotive paint-baking ovens in Southern Ontario; the surveys are expected to be completed in 1979-80. In addition, the Unit co-ordinated sampling programs in 40 companies, evaluated 30

emission-testing reports, completed the revised Source Testing Code and source-testing methods for alcohols and methyl chloride, conducted a seminar on witnessing source tests for inspectors from the two Northern Regions, and completed a research contract on the method for measuring sulphuric acid in metallurgical sources.

Vehicle Emissions

The Vehicle Emissions Section again spot-checked for emission controls and exhaust emissions in 1978-79—6433 cars in twelve Metropolitan Toronto locations and 1959 cars in ten other municipalities. Of this number, 52 per cent failed to meet Ontario emission guidelines, and 3.9 per cent were found with pollution control equipment missing, disconnected, or inoperative. Seventeen charges were laid against vehicle owners. Owners in seven cases were found guilty and fined; five cases were dismissed; five cases were still pending at year-end.

Section inspectors visited 468 used-car dealerships in Southern Ontario and inspected 2264 cars under Section 23 of the Environmental Protection Act. As a result, 142 Violation Notices were issued, and one dealer was charged and convicted. Compared to 1977-78, 125 per cent more dealerships were visited, and 56 per cent fewer Violation Notices were issued.

The Section's two diesel inspectors conducted highway patrols in co-operation with the Ontario Provincial Police (OPP). Altogether, 505 trucks were stopped or reported for excessive smoke emissions — 391 in Metro, 114 in the Kitchener and Burlington areas. The OPP laid 405 charges under the Highway Traffic Act, Section 49(2), and issued 100 warnings. Charges resulted in 350 truck owners being fined, 19 cases being dismissed, and 36 cases still pending at year-end.

Section inspectors made 21 visits to eight community colleges to explain provisions of the Environmental Protection Act and emissions/performance/fuel economy relations to 1613 student mechanics in 56 classes. Exhaust sampling and emission analysis equipment was supplied and installed in Downsview as the first part of a co-operative research program into fuel economy versus emissions with the Ministry of Transportation and Communications.

Continued monitoring of nutrient enrichment problems in Penetang Harbour showed slow response to phosphorus controls because of restricted exchange with the high quality waters of Georgian Bay. The solution to similar problems at Collingwood will be aided by the town's plan to undertake secondary treatment of its wastes.

The results of field work commenced in 1977 have shown significant improvements in the biological communities of the St. Clair River sediments since 1968. This finding reflects progress in abating pollution from industrial sources. Phenol levels declined over the same period.

Bacterial contamination persisted in the Detroit River in the Windsor and Amherstburg areas. Improvements are expected upon completion of sewer separation and the elimination of faulty septic tank systems in Windsor and the completion of remedial measures at the Amherstburg sewage treatment facility. A detailed analysis of total phosphorus loading since 1970 revealed that lower flows, as well as detergent reformulation and sewage treatment improvements, have contributed significantly to a downward trend in the phosphorus load reaching Lake Erie in recent years.

The first year of a two-year, international study of Lake Erie quality was completed in 1978. A final report, to be presented to the International Joint Commission in 1981, will outline the lake's response to remedial measures implemented since the signing of the Canada/US Water Quality Agreement in 1972. Early results indicate that the impact of the Grand River on the coastal zone of eastern Lake Erie, during and after snowmelt events, may extend as far east as Fort Erie. Total phosphorus levels in the eastern basin have remained relatively constant since the initiation of phosphorus input controls in

water resources branch

Director: G. H. Mills

The Water Resources Branch provides information on water quality and available surface and ground water resources throughout the province. Its scientific investigations lead to improved understanding of processes and practices affecting water quality and quantity. In 1978-79, extensive reviews of water management needs and water quality criteria resulted in the publication of updated information on water management goals, policies, and objectives. Continued emphasis was given to increasing information about trace contaminants and the prevention of pollution in lakes, streams, and ground water.

Great Lakes

Some improvement in water quality in the St. Marys River was observed, although Algoma Steel Corp. continued to experience problems in bringing its new coke oven by-product recovery facilities on line. Further monitoring was being planned for 1979-80 when commissioning problems should be resolved.

1970. Total phosphorus concentrations in the western end of the lake remained below the high levels of the early 1970s; however, there was an increase in the amount of algae in 1978.

Since 1969, water quality and currents in the nearshore area of Lake Erie at Nanticoke have been under surveillance to provide a baseline for determining the effects of industrialization. Only minor long-term changes have been detected to date. The water quality is uniform throughout the area but varies with the season. The currents parallel the shore, a west-to-east direction predominating. A study conducted in 1978 in Wheatley Harbour showed conditions to be similar to those observed in 1973 — low dissolved oxygen levels and high bacterial levels. Although remedial measures at Omstead Foods Limited were completed in 1977, operational problems have resulted in failure to meet the expected effluent loading reductions. No contamination was observed in Lake Erie waters adjacent to the harbour outlet. Studies carried out in the western Lake Erie basin indicated a downward trend in total DDT concentrations in young-of-the-year fish since 1975.

The Lake Ontario annual spring surveillance program continued in 1978 on a grid extending from the Niagara River to Kingston. Time-trend analyses of 1972-1978 data have revealed a continuing decline in phosphorus levels along most of the nearshore zone. Decreases in phosphorus levels are attributed largely to detergent reformulation and phosphorus removal at sewage treatment plants.

In order to improve the precision of time-trend analysis, a weekly monitoring program was instituted in 1978 at a site east of Toronto. Frequent sampling was believed to be essential in accounting for the great variabil-

ity in water quality imposed by the dynamic nature of the nearshore zone. Preliminary analyses of the 1978 data have confirmed the use of the approach which will be applied to two locations (east and west of Toronto) in 1979 to monitor changes in areas experiencing rapid growth and development.

The Ministry continued its participation in an inter-agency monitoring program set up to assess trophic status changes in the Bay of Quinte. A dramatic decline in total phosphorus and chlorophyll *a* levels was experienced in the 1979-1978 period. This decline has been attributed in part to phosphorus removal programs on line at all sewage treatment plants discharging into the Bay and to lower precipitation levels experienced in 1978. Despite documented phytoplankton reductions, dissolved oxygen levels continued to be depressed in the deeper sections of the Bay during the summer of 1978.

An intensive, three-year Ministry study of Toronto Harbour came to a close in 1978. Detailed reports under preparation at year-end delineate zones of influence associated with major points of discharge, review water quality trends over the last 10 years, and outline actions necessary for the enhancement and protection of the harbour. Substantial reductions in 1978 bacterial levels along waterfront beaches were confirmed through daily sampling of the harbour. This improvement was likely due to remedial measures instituted by Metropolitan Toronto and to unusually dry weather conditions in 1978. Harbour sediments were found to contain elevated levels of heavy metals such as mercury, lead, zinc, and chromium; higher levels were associated with inner harbour slips and sewer overflows. A similar pattern was observed with PCBs and other trace organic compounds. Recording current and water

chemistry meters were operated in the harbour concurrently with intensive sampling of storm sewer outfalls and the harbour itself to study, in detail, the effects of severe rainfall on water quality. A two-dimensional model was used to simulate the effects of stormwater runoff.

Installation and maintenance difficulties reduced the efficiency of re-aeration through artificial mixing in Hamilton Harbour. Dissolved oxygen concentrations declined rapidly during the spring, and deeper parts of the harbour became anoxic at the end of June. Oxygen levels increased temporarily in July and August, but near anoxic conditions persisted into October. Total phosphorus concentrations in the spring were 25 per cent to 30 per cent higher than in 1977; chlorophyll *a* levels were the highest ever observed in the harbour. Development of predictive models for the harbour continued, and work on the two-dimensional depth integrated model was completed. Work was continuing at year-end to determine the compounds and processes that affect oxygen levels most and to decide what further action can be taken to improve oxygen concentrations.

A new agreement reaffirming the commitment made by Canada and the United States in 1972 to restore and enhance Great Lakes water quality was signed in Ottawa in November 1978. As pollution control in Canada is primarily a provincial responsibility, the Ministry will play a major role in implementing the requirements of the new agreement. A review of the existing Canada/Ontario Agreement Respecting Great Lakes Water Quality was underway at year-end with a view to incorporating changes in shared responsibilities and funding necessitated by the international agreement.

Among the major changes to the 1972 agreement are the following:

- (1) provisions to largely eliminate discharges of toxic substances into the Great Lakes and to establish warning systems to prevent future toxic substances causing problems;
- (2) new interim phosphorus loading targets for each lake, these provisional targets to be finalized and their apportionment between the two countries negotiated within 18 months of the signing of the agreement;
- (3) new final deadlines by which municipal (December 31, 1982) and industrial (December 31, 1983) pollution control programs are to be completed and operating;
- (4) new and revised water quality objectives, including one for radioactivity;
- (5) provisions for dealing with pollution from land-use activities and for examining the problem of airborne pollutants;
- (6) revised monitoring and surveillance requirements for better assessment of the effectiveness of control programs plus provision for a public inventory of discharges and progress in meeting pollution control requirements.

Because of its considerable expertise and experience in the design and implementation of monitoring and surveillance activities for the assessment of water quality problems in the nearshore waters of the Great Lakes, the Ministry continued to be principal advisor on these programs to the International Joint Commission. Baseline plans for each of the Great Lakes, which will guide the surveillance activities of governmental agencies in both Canada and the United States under the 1978 Water Quality Agreement, were nearing completion at year-end and were to be

presented to the International Joint Commission in the summer of 1979.

Significant advances in the understanding of the influence of waste sources, water movement, and thermal effects on water quality of harbours and the nearshore zone were made during the year. The successful implementation of a computerized analysis technique for delineating areas of differing water quality and the incorporation of a variety of computer graphics and mapping techniques contributed to this progress. The Branch also undertook development of field equipment and computer analysis for plume tracking, using the Metro Toronto main sewage treatment plant outfall as a test location. The tests were successful and the methodology will be enhanced further to provide in-situ assessment of limited-use zones under the 1978 Great Lakes Water Quality Agreement and to assess potential water-use conflicts of discharge plumes with recreational areas and water intakes on the Great Lakes.

Increasing awareness of the Ministry's monitoring activities in the Great Lakes has generated a growing number of requests for advice and information on the suitability of Great Lakes waters for municipal and industrial water supply, recreation, and sport fishing. The Ministry received more than 200 inquiries from the general public, industry, consultants, and other governmental agencies in 1978-79.

The Branch participated in the work of the International Great Lakes Diversions and Consumptive Uses Study Board (IJC). (The Study Board is charged with the task of determining effects on Great Lakes Water levels of diversions into and out of the Great Lakes basin, and of increased withdrawals and consumptive uses of water in the basin to the year 2035.) Major input was made to

an inventory of existing withdrawal and consumptive water uses in Ontario, and their projection to the year 2035. The Branch is continuing to contribute to the preparation of the final report of the Study Board, which is to be presented to the IJC in early 1981.

Pollution From Land Use Activities Reference Group

The findings of the Pollution from Land Use Activities Reference Group (PLUARG) were submitted to the International Joint Commission in July 1978. They are summarized in the report "Environmental Management Strategy for the Great Lakes". The report calls for continuing reductions of phosphorous loadings to the Great Lakes and indicates that reductions are feasible for sewage treatment plant effluents, urban runoff, and agricultural activities related to manure spreading and erosion control. The report recommends control of toxic substances at their source where possible and expanded efforts to assess the possible effects of environmental contaminants. Recommendations are given for developing and implementing management plans, stressing site-specific approaches for agricultural and urban areas. The Branch completed reports dealing with pollution from urban, rural, transportation, extractive, and undisturbed land uses in the Grand and Saugeen watersheds; they were published in the PLUARG technical report series.

Inland Lakes

The Branch continued intensive biological and chemical monitoring of highly acidic Clearwater Lake for the sixth consecutive year. It also monitored three other Sudbury lakes neutralized from 1973 to 75. The pH of these lakes has decreased from 6.2 to 5.0 since the cessation of lime treatments, and

phytoplankton communities now resemble pre-neutralization ones. Continued low-level nutrient additions were made to this group of lakes and a control, non-acidic lake in order to better understand and separate nutrient-acid effects. Results indicate that productivity of all these lakes is controlled by nutrients, particularly by phosphorus. The Branch made complete surveys of the surficial and bedrock geology of five Sudbury-area lakes. Intensive monitoring was carried out on these lakes, including the collection of hydrological data and many chemical inputs in precipitation and streams. This information will be used to determine application rates and durations of liming treatments required to counteract acidity.

Acidic precipitation emerged as a major program in 1978 following the first Ministry reports on the problem in 1977. The directions from which acidic materials came were identified, and it was shown that at least 80 per cent of the acidic materials impacting on the Muskoka-Haliburton area come from the south and southwest. Emissions from smelting operations at Sudbury were shown to have low impact in the Muskoka-Haliburton area. At year-end, detailed studies were underway on approximately 20 lakes. Many other lakes were also being studied, but less intensively. No lakes in Muskoka-Haliburton have been shown to be acidic; however, many lakes are being stressed by shock loads of acidic material from snowmelt in the spring and by metals such as aluminum being leached from the watersheds. A research contract was awarded to a consultant to study possible effects of acid rain on the mercury content of fish. The work is to be completed in 1979-80.

The Branch collected yearling yellow perch from ten lakes in the Muskoka and Haliburton area affected by acidification to varying

degrees. Fish were analyzed for mercury and PCBs. Data correlations indicated increased mercury accumulation in fish in lakes with increased acidity. The Branch also collected yearling yellow perch at five sites on the Wabigoon-English River System between Dryden and the Clay Lake outlet. Analysis indicated that mercury uptake by fish in the system was similar throughout the collection area; off-system fish from tributaries had considerably lower mercury levels.

Continuing evaluation of freshwater clams as biomonitoring organisms included placing caged clams along the Muskoka River where fish samples had indicated mercury accumulation in previous studies. The caged-clam data did not support the fish sampling data while natural populations did, an indication that caged clams are poor short-term integrators of this contaminant. Clams have been shown in previous studies to be excellent indicators of organic-chemical contamination.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Compilation of results and preparation of reports was initiated during 1978-79. Results indicate that a significant portion of the phosphorous in precipitation is available to promote the growth of aquatic plants and algae.

The phosphorous removal program at Gravenhurst Bay produced similar, excellent results with respect to the bay's quality in 1978 as in 1977. The destratification project on Heart Lake was monitored routinely; in a similar project on Thompson Lake the fish population was removed in order to prepare the lake for a new bass-stocking program. Two smaller, newly constructed urban lakes

in the City of Mississauga, Aquitaine and Wabukayne, were also monitored. In Aquitaine, which is equipped with a sedimentation pond, water clarity remained high, and aquatic plants began to colonize the pond.

The Branch supervised aquatic plant harvesting over a total area of 880 acres in the Kawartha Lakes. Investigations were continued into the aquatic weed problems caused by Eurasian water milfoil and into factors leading to a decline of milfoil in the Kawarthas. The Branch initiated a field survey to identify aquatic plant communities in 12 acid-sensitive lakes. Monthly detailed plant biomass determinations were made in one acid lake, Clearwater Lake, and two acid-sensitive lakes. The Branch began a project to assess the potential of natural and artificial marshes for further improving the quality of sewage effluent.

Water Management

The Water Resources Branch issued expanded and updated information on the management of surface and ground water quality and quantity in the publication "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment." The Branch also coordinated a project to help implement revised goals, policies, and objectives. An implementation committee and five subordinate working groups have the following objectives: the establishment of systematic procedures for policy implementation; regular review and update of the Provincial Water Quality Objectives; review of implementation to ensure fairness and consistency in application.

The Ministry distributes information widely on trace contaminants such as mercury, PCBs, Mirex, and DDT. During 1978-79, the Ministry issued six environmental health bulletins containing new or updated infor-

mation on contaminants in fish for over 300 watercourses. In April 1978, it published a series of bilingual booklets under the general title "Guide to Eating Ontario Sport Fish" for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 31,000 fish taken from 440 waterbodies; more than 100,000 copies were distributed free of charge. A fourth booklet, "Health Implications of Contaminants in Fish," was also published for sale through the Provincial Bookstore in Toronto. This booklet contains all fish contaminant information, a more complete discussion of the contaminants of concern, and the medical rationale for fish consumption guidelines.

The fish contaminant information program is a co-operative undertaking of the Ministries of Natural Resources, Environment, and Labour. The Ministry of Natural Resources collects the fish. The Laboratory Services Branch of the Ministry of the Environment carries out chemical analyses. The Ministry of the Labour provides medical advice for the consumption guidelines. The Water Resources Branch co-ordinates the program and prepares the information for the environmental health bulletins and yearly booklets. The 1979 versions of "Guide to Eating Ontario Sport Fish" were to be published in April 1979 and include information on 43,000 fish from 625 lakes and rivers.

A report entitled "Mercury in the Lake Simcoe Aquatic Environment" was issued late in 1978. This report outlines the results of an 18-month investigation of mercury in water, sediment, and fish from the Lake Simcoe Basin. The study concludes that Lake Simcoe is not seriously contaminated by mercury. Low levels of pollution associated with human activity has resulted in some mercury enrichment in sediments near urban areas. In general, the level of mercury in fish is low,

but long-term bio-accumulation has resulted in elevated concentrations in some of the larger and older predatory fish such as walleye, largemouth and smallmouth bass, and lake trout.

The Water Resources Branch participated in and co-chaired the Urban Drainage Policy Committee which produced "Proposed Model Policies for Urban Drainage Management" for the Urban Drainage Sub-Committee of the Canada-Ontario Agreement on Great Lakes Water Quality. The report recommends that new approaches be incorporated into the planning and design of urban drainage systems, including master drainage planning and development of pollution control strategies by municipalities, use of the 'major-minor' drainage concept in storm sewer designs, better sediment and erosion control measures, and assessment of the effects of any new development on the water resources of an area. The Branch also helped to complete the "Urban Drainage Manual of Practice". At the request of Southeastern Region, the Branch developed detailed terms of reference for a stormwater management study for the Rideau River in the Regional Municipality of Ottawa-Carleton. The study is to be funded partially by the Provincial Lottery Trust Fund. Participants include the Regional Municipality, the City of Ottawa, the City of Nepean, Gloucester Township, and the Environmental Protection Service of Environment Canada. Purpose of the study is to resolve existing and potential pollution problems in the river in order to maintain it as a unique recreational resource and to evaluate pollution control measures for urban drainage.

The Branch continued development of mathematical modelling techniques to describe effluent mixing zones in rivers. The use of these techniques to evaluate the

mixing and decay of residual chlorine toxicity and free ammonia toxicity in shallow rivers was presented in a report. The Branch also continued improvement of direct measurement techniques for estimating stream reaction rates. Improvement of the Ministry's dynamic water quality model was undertaken as part of the Grand River Basin Study. This technique is a powerful tool for simulating a river system with natural processes and man-made inputs. Major improvements included consideration of urban runoff inputs and aquatic plant effects. The Branch continued surveillance of the water-well drilling industry, issuing 496 licenses to drilling and boring contractors during 1978-79 (38 to contractors being licensed for the first time). One driller was prosecuted; three licenses were placed in temporary suspension for infractions under Section 40 of The Ontario Water Resources Act. Staff participated in six regional meetings sponsored by the Ontario Well Association to upgrade the water-well construction industry.

In concert with the General Counsel and the Legislative Counsel, amendments to Section 39 and 40 of The Ontario Water Resources Act were drafted. The amendments were required to allow for upgrading of the water-well industry with respect to driller licensing, technician certification and training, and well-construction techniques.

Work continued toward reducing incidents of ground-water contamination in the areas of solid waste disposal, salt contamination, and underground petroleum storage. Staff provided advice in developing the Ministry's position on disposal sites in Cobourg, Huntsville, Orillia, Tillsonburg, and a site proposed for Maple. Problems with landfill gas were examined in London, St. Catharines, Oshawa, and Norwood. Assistance was provided to the Regional offices and the Legal Services

Branch for Hearings into the Elliot Lake mine expansion and the Appeal on the proposed industrial-waste disposal plant at Nanticoke. Consultation continued on various Ministry committees and groups including the Landfill Gas Committee, MTC-MOE Contamination Committee, and the Ad Hoc Committee on Gasoline Contamination. Assistance was provided to the Regions and the Ministry of Transportation and Communications in resolving difficult ground-water problems, many associated with the use of salt for deicing.

The Branch continued collecting continuous data on dissolved oxygen and temperature at eight sites in the Grand River Basin. The data are used primarily to verify a continuous simulation, water-quality model. Additional water-quality information on nutrients, sediment, chloride, lead, zinc, and BOD_5 was collected at seven special study sites. Studies of the extent and source of some organic contaminants and the chemical and physical characterization of fluvial suspended sediment were also undertaken.

Information was assembled on water quality, aquatic plants and algae, hydrology, and land use practices for extensive areas of the basin. It will be used in evaluating water resource conditions and predicting the effects of development and various water management options through the use of hydrologic, biological, water quality, and economic systems models. The Branch and participating groups in the Ministry of Natural Resources and the Grand River Conservation Authority are applying the models to evaluate water management plans to meet needs for flood damage reduction, water quality, and water supply in the Grand River Basin. The biological model being developed by Branch staff will predict changes in oxygen levels in the rivers caused by the growth of aquatic plants and algae.

The Branch continued the ground-water resources inventory started in 1977. The study is divided into two major sections: one concerning a basin-wide inventory of ground-water resources; the other, the potential for future supplies for all municipalities in the basin that presently have or are contemplating municipal ground-water systems. The study is also to be used to define ground-water quality throughout the basin and to determine the susceptibility of ground water to contamination from surface sources.

Staff contributed actively to a public consultation program to inform municipal representatives and officials and the public about water management conditions and practices in the basin. The Grand River Implementation Committee directed the study. The Committee consisted of representatives from seven ministries (Agriculture and Food, Environment, Housing, Industry and Tourism, Intergovernmental Affairs, Natural Resources, Treasury and Economics) and the Grand River Conservation Authority.

The first major review of the Permit-to-Take-Water Program was completed with implementation of changes in program administration to be effected in 1980. The automated storage and retrieval systems related to the Permit Program were expanded to include data from five of the Ministry's six Regions.

Water Resources Inventories

The water resources study of the Holland and Black River basins was completed, and a draft report was prepared. The study outlines surface and ground-water resources in the Oak Ridges Moraine area north of Toronto and provides a valuable data base for the Regional Municipality of York's official plan. Plans were prepared for undertaking a similar inventory study in 1979-80 in the Humber and Don River basins.

The results of water-resources inventory studies in the five large river basins of the Moose, Albany, Attawapiskat, Winisk, and Severn Rivers in Northern Ontario were published in three separate reports:

- (1) MOE Water Resources Report 11a: General characteristics and Frequency Analyses of Streamflows;
- (2) MOE Water Resources Report 11b: Ground-Water Resources;
- (3) MOE Water Resources Report 11c: The Water Quality of Selected Lakes in the Arctic Watershed of Ontario.

The three reports summarize field studies undertaken by the Ministry in Northern Ontario during which an extensive hydrometric network was established and maintained; water quality samples of both surface and ground waters were taken; and extensive hydrogeologic field work was carried out.

The Branch provided conceptual and technical supervision to a hydrogeologist hired on a contract basis by the Niagara Escarpment Commission (NEC) to carry out an inventory of ground-water resources within an 800-square mile planning area. The sensitivity of ground-water resources to contamination from possible surface sources in the area was subsequently established and used in developing official plan policies consistent with conservation objectives of the NEC.

The Branch continued the ground-water probability mapping program in 1978-79, and the map for the Regional Municipality of Haldimand-Norfolk was published. The ground-water probability map for the Regional Municipality of Peel was being printed at year-end. Mapping was completed for the southern portion of the County of Simcoe, while mapping of the northern portion was initiated. The program of delineation

of major aquifers was terminated with the publication of maps of the "Oak Ridges Aquifer Complex" and the "Guelph-Amabel and Guelph-Lockport Aquifer Complex."

Three publications—"Water Well Records for Ontario", Bulletins 2-21, 2-22, and 2-23—were released, showing ground-water and geologic data for three regional municipalities and two counties in Southern Ontario. Bulletins 2-102 and 2-103, "Data for Observation Wells in Ontario", containing data on ground-water levels for 1975 and 1976, were released.

The Branch divided information on total phosphorus loads to the International Joint Commission (IJC) for all significant tributaries to the Great Lakes for the 1977-78 water year. Detroit River tributary loads for 1977-78 were provided to the Michigan Department of Natural Resources as input to the Surveillance Subcommittee Report on the Detroit River.

Regional liaison meetings concerning all surface and groundwater networks resulted in the following benefits and improvements:

- (1) All stations in the provincial streamflow network were reviewed with respect to programs of the Ministry and classified according to program needs. Some stations were identified as surplus and dropped from the network.
- (2) Base maps were prepared as a rational planning basis for the observation well network, and each well was assessed within the new framework. Several observation wells were eliminated, and new wells were established. A pilot study was initiated to investigate the variability of ground-water quality with time.
- (3) The water quality network was modified to meet changing environmental needs and fiscal restraints. The resultant reduction of

20 stations and a saving of 10,000 lab determinations lowered costs while maintaining adequate information for management purposes.

"The Trent River Basin: an Interpretation of Selected Data Collected Under the Routine Water Quality Monitoring Program" was published. Three other publications providing basic information on the province's streamflows and inland water quality were released: "Selected Streamflow Data, Ontario, Bulletin 3-12, 1977"; "Water Quality Data for Ontario Lakes and Streams, Volume X, 1976", "Streamflow Data for IHD Representative Basins, 1965-1978".

Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork, and reproduction needs of Ministry programs, Branch staff completed 342 multi-colour and monocolour maps and prepared 1,270 drawings, figures, and illustrations.

Engineering, Scientific and Technical Services

Geophysical surveys involving seismic, resistivity, gravity, well-logging, and VLF methods were utilized in ground-water contamination problems at Emsdale, Georgina Township, and various sites in Northwestern Ontario, and for ground-water development projects at Frankford, Callander, and Plattsville. Specialized assistance was also provided to the University of Waterloo and to the Grand River Study in mapping borehole stratigraphy and bedrock topography. The soils laboratory continued to conduct a variety of analyses on soil samples submitted from various sources within the Ministry.

The Branch assisted Regional staff in conducting intensive surveys to define the effect

of pulp and paper mill effluent discharges on stream water quality and in applying water quality models to set-waste loading guidelines for mills on Junction Creek, the Kapuskasing River, the Abitibi River, and the Sturgeon River in Northeastern Region. Similar tasks were undertaken in West-Central Region in defining discharge guidelines for sewage treatment plant facilities on Canagagique Creek in the Grand River Basin.

The Branch provided technical support and consulting services to the Environmental Approvals Branch and Regional offices in applying Ministry guidelines and proposed policies for stormwater management in existing and proposed new urban development areas. Technical assistance was also provided to the Environmental Approvals Branch in preparing the Ministry's review of the hearings into uranium mining in Elliot Lake.

In co-operation with the Central Region, the Third Annual Water Resources Seminar was held with regional staff to discuss mutual concerns in surface-water quality management.

Bio-assay tests were completed on waste effluents for the three major steel companies—Dofasco, Stelco, Algoma—to determine overall effluent quality from various processes. Information from the program is to be used in development of federal industrial effluent regulations.

In co-operation with Environment Canada, the analysis of hexachlorobenzene (HCB) in fish, Daphnia, water, and sediments was conducted to determine the mobility of this compound through the eco-system. HCB is commonly associated with the chemical manufacturing sector. Preliminary toxicity data were available at year-end but bio-accumulation and transport processes needed further examination.

Agreed methodology for fish tainting was used to evaluate fish exposed to industrial effluents from the St. Clair River for flavour impairment. Chemical analysis of fish samples was incomplete at year-end. Tainting data indicate that effluents containing organic compounds can impair fish flavour; evaluations of this type can be used in the regulation of effluent quality. Bio-assay tests were run routinely on industrial effluents with rainbow trout. These tests meet the requirements of federal effluent guidelines. Standard methods were developed to include the water flea, *Daphnia Magna*, in the bio-assay testing program. Work was continuing at year-end to incorporate computer control of continuous flow bio-assay testing. The continuous flow test provides a more stringent evaluation of effluent quality and is more complex to run than the static test.

The Branch identified microscopic organisms (plankton) in samples from lakes and streams across Ontario for many projects, including those connected with Great Lakes water quality monitoring, acid rain effects, and effects of Ontario's phosphorus control program on the plankton of lakes.

The Branch also examined samples collected by cottagers or lakeside residents and answered questions related to algae growth and drinking water supplies. Experiments were under way at year-end to examine the effects of heavy metals on the plankton of lakes and how the toxic effects of metals are influenced by nutrient enrichment lake acidification.

Significant findings included the discovery of numerous new species of organisms in Ontario's lakes. Many of these new species are common in the slightly acidic lakes of the Precambrian Shield; however, their significance in terms of continued lake acidification and the health of the food web

is not yet fully understood. The plankton studies also demonstrated that the joint U.S./Canadian phosphorus removal programs have been effective in controlling algae growth in several Ontario waters, including Lake Erie's western basin.

and undeveloped lots with regard to private sewage disposal, and to the acceptance of proprietary systems.

The Advisory Committee on Private Sewage Disposal Systems held seven meetings and initiated a review of O.Reg. 229/74, especially as it pertains to leaching beds in heavy soil areas. In addition, a sub-committee completed the production of a training film and slide program on septic tank systems. Summary reports of program activity were prepared for the private sewage program and the boating and marina inspection programs. Meetings were held to outline boating and marina program requirements for 1979-80.

The Municipal Sewage Unit completed revision of draft guidelines for the inspection of digester gas systems in existing sewage treatment plants to ensure their safe operation. Recommendations regarding the review and approval of new digester gas systems were also drafted.

The Operating Summaries for 1977, covering Ministry-operated water and sewage facilities, were published. A complete listing of all water and sewage works in Ontario for 1977 was issued and will be updated annually. Policies and guidelines for energy conservation in sewage treatment, land application of sewage plant effluents, disinfection of wastewater, and wastewater treatment plant sampling procedures were being prepared at year-end.

Under the Municipal Infrastructure Agreement between Central Mortgage and Housing Corporation (CMHC) and the Ministry of the Environment, CMHC financing for sewage and water works construction in Ontario for 1978 was as follows: \$85.0 million in loans, \$20.4 million in grants, \$7.6 million in high-cost construction grants. This Agreement terminated on December 31, 1978.

pollution control branch

Director: K. C. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations, and guidelines to control the emission of contaminants. Supplementary functions include applied research, technology transfer, technical advisory service, and delivery to certain aspects of the pesticides and noise control programs.

Municipal and Private

The Municipal and Private Section is responsible for policy development and program audit in connection with municipal water supply, pollution control, and private sewage systems.

The Private Sewage Unit obtained approval for amendments to O.Reg. 229/74, one of which offered manufacturers of prefabricated septic and holding tanks a choice of methods in obtaining acceptance of their products. Notices were forwarded to Regional Municipalities, Health Units, and Ministry Regional and District offices concerning program matters. The most significant of these notices related to policy concerning the inspection of subdivisions, severances,

Under the terms of a new agreement between the federal and provincial governments, Ontario became responsible for administering federal grants to assist construction of municipal water and sewage services under the Community Services Contribution Program. This program was developed to replace the Municipal Infrastructure Program (previously administered by CMHC) and is intended to be more readily adaptable to changing municipal and provincial priorities. It should also reduce duplication of administrative effort and related inefficiencies between federal and provincial governments. In total \$31 million of grants were to be made available for facilities built in 1979. Eligibility criteria for grants under the new program are to be initially the same as those utilized under the CMHC program.

The **Municipal Sewage Unit** implemented the phosphorus removal program under the Canada-Ontario Agreement on Great Lakes Water Quality. Monitoring and evaluation of the program were under way at year-end. In 1978-79, 214 wastewater treatment plants throughout Ontario were controlling phosphorus inputs to lakes and rivers; approximately 500 tons of phosphorus are removed yearly from sanitary wastes.

The Municipal Sewage Unit is responsible for identifying and quantifying waste from municipal sources discharging into the Great Lakes. All waste loadings, as well as the status of existing and intended remedial programs, are reported yearly through the IJC Water Quality Board Annual Report.

The Unit concentrated considerable efforts on urban drainage management and sewage sludge utilization on agricultural lands. A draft policy and guidelines package on urban drainage management was completed, and policy implementation procedures were under development at year-end. Guidelines

for the utilization of sewage sludge on agricultural lands were completed and, at year-end, awaited final approval prior to implementation.

The Unit co-ordinates the development and operation of a management information system. In conjunction with regional representatives from the Utility Operations Section, work was completed on a performance data collection system for ministry-operated water and wastewater utilities. At year-end all ministry-operated works were reporting to the system. Output reports on the annual and monthly operating data, as well as summary reports on plant capabilities, efficiencies, and loadings, were made available to the Regions on a quarterly basis. Work was begun on determining data collection procedures for municipally-operated utilities, which will make utilities performance reports available for the entire province.

The **Municipal Water Unit** worked on the development of a cross-connection control manual for Ontario in 1978-79. The manual is to deal with both legal and technical aspects; at year-end, the technical aspects were under review by the Canadian Standards Association.

The Unit continues to serve on the MOE/Ministry of Health Committee on household water treatment devices. Guidelines for ultraviolet disinfection and iodine disinfection devices were prepared. Manufacturers and distributors have asked the Canadian Standards Association to canvass opinion on the need for standards for various household water treatment devices. The Committee has indicated its support for such standards.

Quality control in the manufacture and transportation of water chemicals was under review at year-end. Chemicals were being sampled and information gathered to deter-

mine whether or not additional controls are required.

The Unit represented Ontario on the Federal/Provincial Working Group on Drinking water, which was established to complete a major review of the Canadian Drinking Water Standards. This task was essentially completed by September 1978 when a draft document was submitted to the Advisory Committee on Occupational and Environmental Health. One item, the radio-activity objective, was still under discussion at year-end.

Noise Pollution Control

The Noise Pollution Control Section received 448 new noise complaints in 1978-79. Complaints of excessive noise from industry resulted in 165 investigations, and permission was granted to prosecute one persistent offender. The Section also investigated 95 complaints of air conditioner noise, 73 complaints of blasting concussion noise, and 115 complaints of miscellaneous noise activities. Provincial officers were called upon to provide expert testimony in 12 actions launched by various municipal and private parties.

The final report of the Model Municipal Noise Control By-law was published in August 1978. Twenty municipalities, accounting for more than 20 per cent of Ontario's urban population, have adopted noise control by-laws under Section 95a of the Environmental Protection Act. At year-end, 20 additional by-laws were being prepared for submission to the Minister of the Environment for his approval.

The fourth year of the Environmental Acoustics Technology training program sponsored by the Ministry was successfully completed. An external contract has been awarded to provide a draft Acoustics IV training manual, the final text in the planned series of training materials.

The Noise Pollution Control Section has provided technical comment on more than 2000 new land-use proposals and industrial projects in the four years since the noise impact assessment program was formalized. Increasing attention has been given to assessing class environmental impact statements, inter-government studies on transportation noise problems, and use of lands subject to Ministerial zoning orders.

The Section sponsored and guided the following major research projects: a study of the effects of transportation noise (funded by the Provincial Lottery Trust Fund); an investigation of noise emissions from a railway marshalling yard (funded by the Transportation Development Agency of Transport Canada); a study of community response to railway noise (funded by Experience '78). The United States Environmental Protection Agency used data from the last study in preparing U.S. Railroad Noise Rules. Two other noise-related projects were funded under the Ministry Experience '78 program. Both were external study projects on transportation noise and were awarded to two Ontario universities.

Pesticides Control

The Pesticides Control Section promotes a balance between pesticide use and environmental protection. The Section classifies pesticide products, licenses exterminators and vendors, issues permits for pesticide use, educates the public with publications, and provides training courses, fact sheets, and study guidelines for industrial and commercial education programs. The Section carries out its programs under The Pesticides Act, 1973 and Ontario Regulation 618/74.

The summer of 1978 was the third consecutive one in which municipalities south of a line drawn between Sarnia and Toronto

were urged to participate in mosquito abatement programs. This area was designated by the Ministry of Health as a high-risk area after 67 cases of St. Louis encephalitis were reported during the fall of 1975. Due mainly to dry weather in the late summer, mosquito populations remained relatively low, and no human cases of encephalitis were reported. Accordingly, spraying activity was reduced.

The termite control program is directed towards providing technical and financial assistance to municipalities experiencing problems with this insect. Public education is a large part of the program. At year-end, surveys were being carried out in all Metropolitan Toronto boroughs and in 15 other communities. The Section conducted a termite survey using wooden bait blocks. In all, 9,400 blocks were examined, and various degrees of activity were found. In addition, a research centre program was initiated in Guelph involving the planting of 12,000 blocks.

The following is a list of grants approved for chemical treatments and structural alterations required for the control of termites:

Municipalities	Chemical	Structural
Town of Kincardine	21,348.00	9,837.44
Town of Leamington	2,280.00	2,549.15
Village of Elora	3,142.92	2,145.80
City of Guelph	2,005.80	2,751.00
Borough of East York	11,403.00	3,959.92
Borough of Scarborough	6,965.40	6,097.00
City of Toronto	65,916.96	98,646.33
Borough of Etobicoke	840.00	640.42
Town of Fergus	1,446.00	399.00
Township of Nicol	216.00	
TOTAL	\$115,564.08	\$127,026.06
		\$242,590.14

Altogether, 445 treatments were successfully completed, and grants totalling \$175,000.00 were paid to homeowners.

During 1978-79, the Pesticides Control Section gave 2,158 examinations and issued approximately 6,043 exterminator, 917 operator, and 3,572 vendor licences. The Section also issued 103 permits for the use of restricted products on land, 402 permits for the application of pesticides to water, and 225 permits for structural extermination.

Research continued to be conducted at selected water sites throughout the province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

Research and Development

The Co-ordination and Technology Section is primarily responsible for internal and external co-ordination and liaison in matters related to research, and for administration of the research facility.

The Supervisor is Chairman of the Ministry's Research Advisory Committee and maintains liaison with other research groups in the Ontario government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. During the year, contact was maintained with the United States Environmental Protection Agency, particularly their drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section participated in the Association's research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Twenty-two health-related environmental projects were funded at a cost of \$1.919 million in

1979-80. Project subjects included viruses, toxic organics, carcinogens, noise, acid rain, PCBs, ozone, mercury in fish, and air quality effects on human health. Funding was to continue with a modest increase in 1979-80.

Applied Sciences

The Applied Sciences Section carries out investigations and reports on innovative concepts relating to environmental protection and enhancement. Nine studies were under way at year-end, primarily in the fields of alternative private waste systems and improved construction techniques for municipal utilities in cold regions. Six reports and two papers were prepared during 1978-79.

Wastewater Treatment

The Wastewater Treatment Section advances the quality of wastewater treatment in Ontario by maintaining and upgrading the level of expertise in wastewater treatment technology through developmental research and by providing expert advice and assistance to planning, control, and operational staff of the Ministry, municipalities, and industry. The Section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant for use in developmental research work and operator training.

At year-end, the Section was involved in seven research projects dealing with effluent disinfection, ammonia removal, hydrogen sulfide stripping, aerated lagoon design, and stormwater treatment. During the year, seven final reports, six interim reports and twelve technical bulletins were prepared. Ten

technical papers were presented at conferences, workshops, and seminars.

In an advisory capacity, Section staff made 115 site visits to municipalities and operating treatment facilities and prepared 75 follow-up memoranda and reports. Section staff assisted in the preparation and/or review of design proposals for approximately 22 facilities.

Section staff participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorination Workshop, the Digester and Primary Treatment Course, and the Sampling and Monitoring Course within the Ministry's training program.

Water Technology

The Water Technology Section conducted research concerning ozone, trace organics (including haloforms), iron and manganese treatment, asbestos, effect of treatment processes on treated quality, distribution systems, and micro/macro-biological water quality.

Trace organic work involved a revised province-wide sampling survey to add new locations and resample locations with yearly averages over 30 ppm. Under Provincial Lottery funding, investigations were under way at year-end into alternate disinfection procedures at Belleville and the use of granular activated carbon to reduce haloforms in treated water at Brantford.

Ozone pilot work was carried out at the Hawkesbury waste treatment plant to examine the potential of ozonation for water treatment and colour removal. A Lottery project was proposed, funded, and contracted for the study of ozonation water treatment and by-product formation.

The asbestos monitoring program covers

all municipal water supplies; levels in 1978-79 were low or at the detection limit for asbestos fibres. Technical advisory work was carried out concerning new water plant commissioning, plant up-rating, and plant operational and technical problems.

Contingency Planning

The Contingency Planning Section revised and updated the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials and two publications supplementing this manual. The contingency plan is intended to organize the activities of the various governmental agencies which may be involved in a spill incident of major proportions. The Ministry of Labour co-signed the provincial plan, thereby bringing the total number of participating agencies to nine.

The Section continued to assist in the development of several contingency plans for municipalities and major corporations. The Section also continued to assist in the development of the Detroit-St. Clair River Supplement and the St. Lawrence River Supplement—detailed response mechanisms under the Joint Canada-U.S. Marine Contingency Plan which would come into force in spill incidents crossing the international boundary.

Section staff participated in the preparation and delivery of several spill response training exercises, seminars, and workshops. Included were "hands-on" oil spill exercises at Parry Sound (co-ordinated by Shell Canada Limited) and Nanticoke (co-ordinated by the Hamilton Spill Control Group) and a mock exercise at Jordan Harbour (co-ordinated by the Sun Oil Company). A workshop for governmental and oil company on-scene co-ordinators, ar-

ranged by PACE and held in Toronto, was also very successful.

During 1978-79, the Section received spill reports on 490 incidents. Of these, 338 involved the loss of oil; 82 the loss of liquid or solid hazardous materials; 14, gaseous materials; 56 other contaminants.

The Section participated in the preparation of amendments to The Environmental Protection Act, 1971, as introduced in Bill 209 and, subsequently, Bill 24. These amendments will increase notification requirements, create clean-up and restoration duties for the owner and person in charge of spilled contaminants, define liabilities, create an incentive for preventative programs, establish a legal basis for municipal response, and provide authority for the Minister to order that action be taken or to initiate action through employees or agents.

environmental approvals branch

Director: D. P. Caplice

The Environmental Approvals Branch provides an approvals function for companies, individuals, and governmental agencies requiring approvals for their projects under The Environmental Assessment Act and sections of The Ontario Water Resources Act.

Environmental Assessment

The Environmental Assessment Section is responsible for managing the implementation

of The Environmental Assessment Act and co-ordinating the review of projects coming under the Act. The Environmental Assessment Act is a decision-making tool in which the proponents of major projects show in a public environmental assessment document how and why the project is needed in its preferred form and how detrimental environmental effects caused by the project during its construction, operation, and retirement will be lessened or eliminated. At year-end, the Section was in the process of completing the application of the Environmental Protection Act to provincial ministries and agencies, finalizing details involving implementation of the Act to the municipal sector, and conducting studies as to how the Act will be applied to private sector undertakings.

The Section continued to develop Ministry policy and submissions on environmentally significant matters concerning the nuclear power industry in 1978-79. The Section co-ordinated the Ministry's submissions to the Royal commission on Electric Power Planning; co-ordinated the Ontario Government's review of environmental impact documents submitted by Eldorado Nuclear Limited to the federal environmental Assessment and Review Panel for the planned development of a uranium hexa-fluoride processing plant at Port Granby; participated in hearings by the Environmental Assessment Board concerning uranium mining expansion plans by Denison Mines and Rio Algom Mines at Elliot Lake.

Concerning projects under the Environmental Assessment Act, section staff continued to prepare environmental assessment document guidelines, consult with proponents on the form and content of environmental assessments, review draft environmental assessments, and prepare formal reviews of environmental assessment documents.

During the year, environmental assessments were formally submitted for the first time by several governmental agencies. Among the 16 submissions were those dealing with highway widenings (Ministry of Transportation and Communications); the Colonel Samuel Bois Smith Waterfront in Etobicoke (Metro Toronto Regional Conservation Authority); access roads (Ministry of Natural Resources); the Highway 89 extension from Highway 400 east to Highway 12 (Ministry of Transportation and Communications); major transmission lines, transformer stations, and new communication towers (Ontario Hydro); expansion of the Welland Water Treatment Plant (Ministry of the Environment); solid waste disposal (Ministry of Natural Resources); the Haldimand-Norfolk regional water supply scheme (Ministry of the Environment).

Section staff consulted on the Upper Thames Conservation Authority, Glengowan flood control dam; the Orillia Water, Light and Power Company Go-Home Bay hydro-electric power dam; the INCO hydro-electric power dam on the Spanish River; the Onakawana Development Limited lignite mine on the Ontario Northland Railway line south of Moosonee. They also reviewed 100 Ministry water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act in October 1977 when the Act came into effect. Exemption was granted because the projects were too far advanced to be properly assessed under the Act or too small to be of major environmental significance.

Section staff addressed or otherwise participated in 74 illustrated lectures on The Environmental Assessment Act as well as at numerous conferences and seminars. They also supervised 13 Experience '78 projects.

Industrial Approvals

During 1978-79, the Industrial Approvals Section continued to provide technical expertise in the field of industrial pollution control and to process applications for Certificates of Approval.

More applications were received and processed in 1978-79 than in 1977-78, largely because of an 18 per cent increase in waste disposal applications. Industrial air pollution control applications dropped significantly in number as a result of a continuing slowdown in the construction of large industrial sources that started in 1977-78. Fifteen per cent more industrial waste water applications were received, as many existing waste water control facilities underwent improvements and long overdue expansions.

Waste disposal applications received more in-depth technical appraisal in 1978-79. This thoroughness of review gave rise to a number of administrative problems mainly

caused by incomplete and incorrect information being supplied by proponents in support of their applications. Most of these problems were resolved; applications dealing with hauled liquid industrial waste of a hazardous nature required the most attention.

Section staff gave increased time and technical assistance to the Legal Services Branch in 1978-79 through testimony as expert witnesses at legal prosecutions, attendance and assistance at hearings, technical appraisal of control orders, and the introduction of charges under Section 8 of The Environmental Protection Act governing accidental spills.

Major projects requiring staff input included Ontario Hydro installations at Bruce, Pickering, and Wesleyville; the proposed Eldorado Nuclear Limited plant on Lake Ontario; a \$250-million expansion by Dofasco at Hamilton; grain handling and drying systems; a PCB storage depot at Smithville; new auto production facilities for aluminum engines to

Applications received and processed in 1978-79 are summarized below:

APPLICATIONS PROCESSED*

APRIL 1, 1978 — MARCH 31, 1979

	Received	Approved	Cancelled	Denied
Air	680	619	71	9
Water	100	87	10	1
Waste	121	98	4	1
TOTAL	901	804	85	2

* Does not include 250 applications processed by the Technical Support Section of Central Region and forwarded to the Industrial Approvals Section for checking and approval.

be built by Ford Motor Co. at Windsor. The project to treat saline waste waters was abandoned by Dow Chemical Co.

Municipal and Private Approvals

The Municipal and Private Approvals Section processes approval applications made by municipal and private agencies for water supply and distribution systems, wastewater collection and treatment facilities, and sites and systems associated with waste management programs. The Section also licenses septic tank installers and waste haulers and provides technical approval to applications made under Central Mortgage and Housing Corporation's subsidy programs and the Ministry of Environment's regional subsidy program.

In 1978-79, the Section processed approximately 3,000 applications and approved over \$700 million worth of water and sewage works for construction. The processing function was aided by the Ministry's transfer program in which selected municipalities assist with the technical review of applications. Additional municipalities were brought into the program during the year, and it is intended to extend this program further. The program was supported by draft design guidelines that were finalized during the year and are to be made available throughout the province.

Considerable public interest was expressed concerning waste management disposal programs for which stricter requirements were adopted. The trend to larger regional sites being proposed to replace smaller, inadequate facilities continued. In 1978-79, the Section received 242 waste disposal site applications of which 220 were approved. The applications resulted in ten hearings before the Environmental Assessment Board, four appeals, and various court

actions. At year-end, there were 1,570 certified waste disposal sites in Ontario.

The Hughes Enquiry into the affairs of Waste Management Incorporated was completed, and both the staff of the Ministry of the Environment and the other ministries identified were exonerated of any wrongdoing.

Waste disposal site applications for extensive landfilling in Maple by Crawford Allied Industries and Superior Sand, Gravel and Supplies Limited were turned down by the Director of the Environmental Approvals Branch on the recommendation of the Environmental Assessment Board. The Director's decision was promptly appealed to the Environmental Appeal Board where the matter was being heard at year-end.

Additional applications for licenses from septic tank installers and waste haulers were received during the year; 3,600 licenses have been issued to date. Three licenses were successfully revoked without appeals.

Land Use Co-ordination and Special Studies

The Land Use Co-ordination and Special Studies Section advises other governmental agencies at all levels and the private sector on environmental matters related to land use planning and economics. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans, and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use as well as on economic matters as related to the environment in controlling pollution.

In 1978-79, the Section represented the Ministry on various interministerial or inter-governmental committees concerning the

Agricultural Code of Practice, clean-up of low-level radioactive waste, the Canada-Ontario Agreement on the Flood Damage Reduction Program, the Niagara Escarpment Commission Planning Area, Ontario Base Mapping, the Parkway Belt, implementation of the development strategy for Simcoe County, cottage land policies, statistics on environmental data, studies under the auspices of the International Joint Commission, air quality standards setting, water quality objectives, the Grand River Basin, the West Patricia Land Use Plan, urban drainage, and the special task force on the Ontario pulp and paper industry.

The Section provided technical back-up to the Ministry's representative on the Land Use committee of the Resources Development Policy Field and reviewed 16 documents submitted under The Environmental Assessment Act, 1975. Economic studies and financial analyses of several companies and industries were also carried out to assess the economic impact of pollution abatement. At year-end, studies were under way on methods and procedures for setting industrial pollution abatement priorities on the basis of environmental effects.

The Section reviewed the Commissioners' Reports on reviews of the regional governments for the Regional Municipality of Waterloo and the regional municipality of Niagara. It also reviewed and provided comments on the Official Plans for Haldimand-Norfolk, Metropolitan Toronto (Metroplan), York Region, and projects leading to major amendments to the Official Plan for Ottawa-Carleton.

The Section started a major revision of the Land Use Planning Review Handbook, which is used by Ministry field staff in reviewing development proposals.

During 1978-79, Section staff gave 12 invited speeches to conferences and seminars, seven lectures to universities, polytechnical institutes, and community colleges, and presented testimony before the Environmental Assessment Board and the Legislature's Standing Committee on Resources Development. Staff also supervised ten Experience '78 projects.

project co-ordination branch

Director: J. C. F. Macdonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating, and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1978-79, the Branch handled 249 construction contracts and administered a capital expenditure of approximately \$147 million. Of this amount, 34.6 per cent was paid out as subsidies under the Ministry's construction program for municipalities. (See Table I). In addition, the Branch was assigned the responsibility for administration and budgeting of the Direct Grants as part of a new policy that became effective on April 1, 1978. This policy broadened the availability of grants to assist the construction of municipally-owned water and sewage facilities.

Effective March 1979, following the signing of an agreement between the governments of Ontario and Canada, the Branch commenced administration and budgeting for the new Federal Community Services Contribution

Program (CSCP) which replaced the former Central Mortgage and Housing Corporation (CMHC) infrastructure assistance program.

The Branch started construction on a number of new water and sewage works projects for municipalities having no communal facilities and extended existing facilities in many other municipalities. It also continued major sewage and water projects in South Peel Region and the York-Durham Area and undertook major extensions to water treatment facilities in Haldimand-Norfolk Region to permit the development of new housing. Completion of commitments, based on a 1974 5-year agreement with Niagara Region, was achieved; the Regional Municipality will develop and construct new projects, beginning in 1979-80.

In Northern Ontario, generous provincial government subsidy, combined with CMHC grants for high-cost projects, enabled the Ministry to continue with the provision of communal sewage and water facilities that will allow for growth and expansion of industry and housing. Additional funding provided through the Ministry of Treasury and Economics under DREE (Federal Department of Regional Economic Expansion) and RPB (Ontario Regional Priority Budget) schemes, enabled water and sewage works to continue under this Branch's direction in Geraldton, Nakina, and Longlac. A similar program for the City of Timmins is proceeding under the City's administration.

In addition to the regularly subsidized sewage and water projects, the Ministry also administered a number of other projects financed either solely by the Ministry of Northern Affairs or jointly by the Ministry of Northern Affairs and the Department of Regional Economic Expansion. Projects financed by the Ministry of Northern Affairs included sewage and water works for Kenora,

Ear Falls, Red Lake, Blind River, White River, Atikokan, Gore Bay, and Schreiber. Jointly-funded projects included works for Longlac, Geraldton, and Nakina. All of these works were well advanced at year-end; completion was scheduled for late 1979. Total estimated cost of these works: \$30,000,000.

Wasaga Beach sewage and water works projects were commenced in 1978-79. Funded through the Ministry of Natural Resources and administered by this Ministry, the projects were valued at approximately \$16 million and scheduled for completion over the following three years.

The Management-by-Results (MBR) system continued to be applied to all new applications for grants considered.

MBR grant eligibility evaluation for 1978-79 was as follows:

	No.	Estimated Cost
New grant requests accepted	87	\$ 87,805 M
New grant requests rejected	27	8,465 M
Total Evaluated	114	\$ 96,270 M

The Branch continued to administer the grants program for the construction of regional or area sewage and water treatment facilities in regional and specially restructured municipalities. These grants amounted to \$13,731 million in 1978-79. Effective April 1, 1978, grants for regional and restructured municipalities were amalgamated with the Direct Grant Program, and these municipalities became subject to the same MBR assessment as all new direct grant projects. Graphs I through IV for fiscal years 1973-74 to 1978-79 show:

- (1) annual total expenditures for sewage projects and for water projects;
- (2) annual total expenditures for provincial projects and for municipal projects;

- (3) number and value of contracts tendered;
- (4) construction activity by number of contracts.

(See Graphs—I-IV, pages 53 to 54)

The Branch's Groundwater Development Section supervised eight test-drilling contracts and four well-construction contracts with a total value of \$355,000. The Branch also undertook eight groundwater surveys and 16 special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

The Branch monitored innovative techniques for the construction of communal facilities in northern areas. Construction was completed on a low-pressure, shallow-buried sewer system for the old Townsite of Temagami.

During 1978-79, the Branch continued to administer the concrete sewer pipe plant pre-qualification program. Thirteen concrete sewer pipe plants had prequalified status in 1978-79.

The MEA-MOE Construction Inspectors' Courses (Nos. 1 and 2) were held again during the year. Approximately 50 candidates from municipalities and consulting engineering companies attended the one-week courses.

The Special Activities Unit performed approximately 104 field inspections of Ministry sewer and water projects, both at times of substantial completion and at expiry of contract guarantee periods.

Considerable work was performed in the review and drafting of standards, specifications, and Ministry policy for construction and materials, and in the evaluation of new products proposed for incorporation into capital works undertaken by the Ministry.

During 1978-79, the Branch's Claims and Contracts Section handled nine claims of a

contractual nature. At year-end, nine claims were either in the course of or had been referred to arbitration, and eight claims were in litigation. One claim under The Public Works Creditors Payment Act was outstanding at year-end. Approximately 95 claims amounting to \$2,384,605 were received pursuant to The Mechanics' Lien Act. The Section also dealt with several insurance-related claims.

The number of contracts tendered and executed during 1978-79 were as follows:

<u>Contracts Tendered</u>	
101	
<u>Contracts Executed</u>	
102	
<u>\$ Value of Contracts Executed</u>	
111,880,475	

TABLE I	
PROJECT CO-ORDINATION BRANCH	
Volume of activity under Capital Construction Program during 1978-79	
1) Capital Expenditure	147,325,000
Sewage Works	96,659,000
Water Works	50,666,000
Provincial Projects	142,961,000
Municipal Projects	4,364,000
Provincial Subsidy	50,914,000
% of total expenditure	34.6
2) Construction	
Contracts Tendered - No.	101
- \$ Value	118,100,000
Contracts Started - No.	109
- \$ Value	105,904,000
Contracts Completed - No.	115
- \$ Value	140,935,000
Contracts Under Construction During the Year	249
Average Number of Contracts Under Construction in each month	136
3) Grants to Regional and Restructured Municipalities	
No. of Municipalities Participating	14
Value of Grants Paid	13,731,000

waste management branch

Director: L. F. Pitura

The Waste Management Branch was formed on August 1, 1978 by incorporating elements of the Pollution Control Branch and the Resource Recovery Branch. This regrouping brought all head-office functions related to the management of solid, liquid, and hazardous wastes within one organizational structure.

Experimental Plant for Resource Recovery

The Experimental Plant for Resource Recovery was officially opened by the Premier of Ontario on August 1, 1978. The transfer station section of the plant continued its successful operation at 50 per cent higher-than-design capacity. All processing systems were put into operation, and a 12-month program was initiated for gradual build-up to full design capacity. Market development programs continued and were expanded to include materials being recovered from processing operations at the plant.

A significant hazard associated with processing plants is the potential for shredder explosions due to flammable liquids or explosives. Following two such explosions at the Experimental Plant, an intensive investigation was launched to determine means of reducing the incidence, extent, and damage resulting from such accidents. The potential for fires, which is also a significant hazard, was successfully resolved by the combina-

tion of a selective suppression system and the development of detailed operator training procedures.

Material/Energy Recovery

Engineering design work continued on the Region of Peel material/energy recovery project in accordance with the agreement between the Region, the Ministry, and Reed Limited. Concerning the Watts from Waste projects, the Ministry, Metropolitan Toronto, and Ontario Hydro agreed that a technical and economic review of the project should be carried out before proceeding with construction because of escalating equipment costs and technical problems being experienced at similar plants in the United States.

The construction and commissioning of facilities at the Canada Cement Lafarge plant at Woodstock were completed; trial runs were carried out using RDF produced at the Experimental Plant in preparation for the full-scale demonstration project due to commence early in 1979-80.

Subsequent to an extensive joint review by the Ministries of the Environment and Energy, a program for the encouragement of energy-from-waste projects was developed and approved.

Source Separation

Four major pilot projects on residential source separation were initiated in co-operation with the municipalities of Etobicoke, the City of Toronto, Aurora, and Georgetown.

The success of the desk-top separation of fine office paper at the Ministry's head office building led to the decision to extend the program to 13 other government buildings in Metropolitan Toronto in early 1979-80.

Solid Waste Management

Under Project REMOVE, the Solid Waste Unit developed 30 contracts with municipal agencies at a cost of \$225,000. A total of 57 sites have been established to date; it is planned to withdraw further financial support after 1979-80.

The Unit initiated a gas migration study to investigate changes in gas migration patterns caused by natural or manmade restrictions. Remedial measures will be evaluated and guidelines developed in order to facilitate recommendations regarding the use of land that may be affected by gas production at old sites.

New guidelines were developed for landfill site establishment and operation, and proposed amendments to Regulation 824 were finalized. These changes will provide greater flexibility to the Regions and ensure further protection of the environment.

The Pathological Waste Task Force submitted a report to senior management outlining a strategy to control pathological waste from generation to final disposal. The report was under consideration at year-end.

The Waste Management Improvement Program included 80 contracts worth \$210,000 and involved many aspects of site improvement and up-grading.

Disposal of Liquid Industrial Wastes

In October 1978, the Minister of the Environment introduced a seven-point program to the Standing Committee on Resource Development for the disposal of liquid industrial wastes. The Waste Management Branch has initiated a number of activities to implement the program, including the automation of the way-bill monitoring system; submission of a report by M. M. Dillon Limited on the storage and handling of

PCBs; retaining of James F. McLaren Limited for the reporting on requirements for a variety of waste treatment facilities; funding of engineering costs for the conversion of the Duffin No. 2 WPCP to an industrial liquid waste treatment facility; development of various guidelines and regulations; establishment of a task force to develop a "perpetual-care" program for waste disposal sites.

Transfers of Liquid Industrial Wastes

Automated equipment to process data from way-bill forms was put into operation during October, 1978. Major revisions to the form were introduced in January, 1979 in conjunction with the introduction of guidelines for the treatment and disposal of hauled liquid industrial wastes. Program results were generally encouraging during the year; there was a significant decrease in the percentage of unreported transactions by waste receivers.

Proposed Liquid Industrial Waste Treatment Facility

A study by Simcoe Engineering indicated that the conversion of the Duffin No. 2 WPCP in Ajax to treat liquid wastes in Durham and other municipalities was technically and economically feasible. The Ministry indicated its intent to fund the engineering costs up to \$170,000 and possibly the capital costs with a pay-back system. The necessary agreements and engineering works were proceeding at year-end.

PCB Handling and Disposal

A guideline relating to the management of PCBs and the prevention of PCB pollution was issued in 1978, thereby providing much needed guidance for both government and industry personnel. A need for control of the

movement of contaminated electrical equipment became apparent, and work on a regulation under The Environmental Protection Act was begun.

The acceptability of the cement kiln for PCB destruction at St. Lawrence Cement was the subject of a hearing before the Environmental Assessment Board at year-end. A report by the Director of the Waste Management Branch advocating use of this process was presented to the Board in December 1978, and the formal hearing process commenced in February 1979. The hearing was expected to continue through much of 1979.

Various organizations were investigating alternative methods of PCB destruction or removal, including the treatment of material and wastes containing low levels of PCB as well as the destruction of more concentrated materials. The Wetox process was being investigated at the Ontario Research Foundation; the Plasma Arc approach was being considered at the Royal Military College in Kingston. While these two processes have merit for specialized applications, considerable development would still be needed, and early utilization appears unlikely. Research at the University of Waterloo holds some promise for the removal of low levels of PCBs from transformer oils by chemical methods.

Until disposal can be arranged for PCBs, interim storage of wastes and contaminated equipment is needed. M. M. Dillon Limited, consulting engineers, was retained in December 1978 to review the needs for PCB storage in Ontario, develop a conceptual design for an interim storage facility, and locate suitable sites. The consultant's draft report was to be submitted to the Ministry in April 1979.

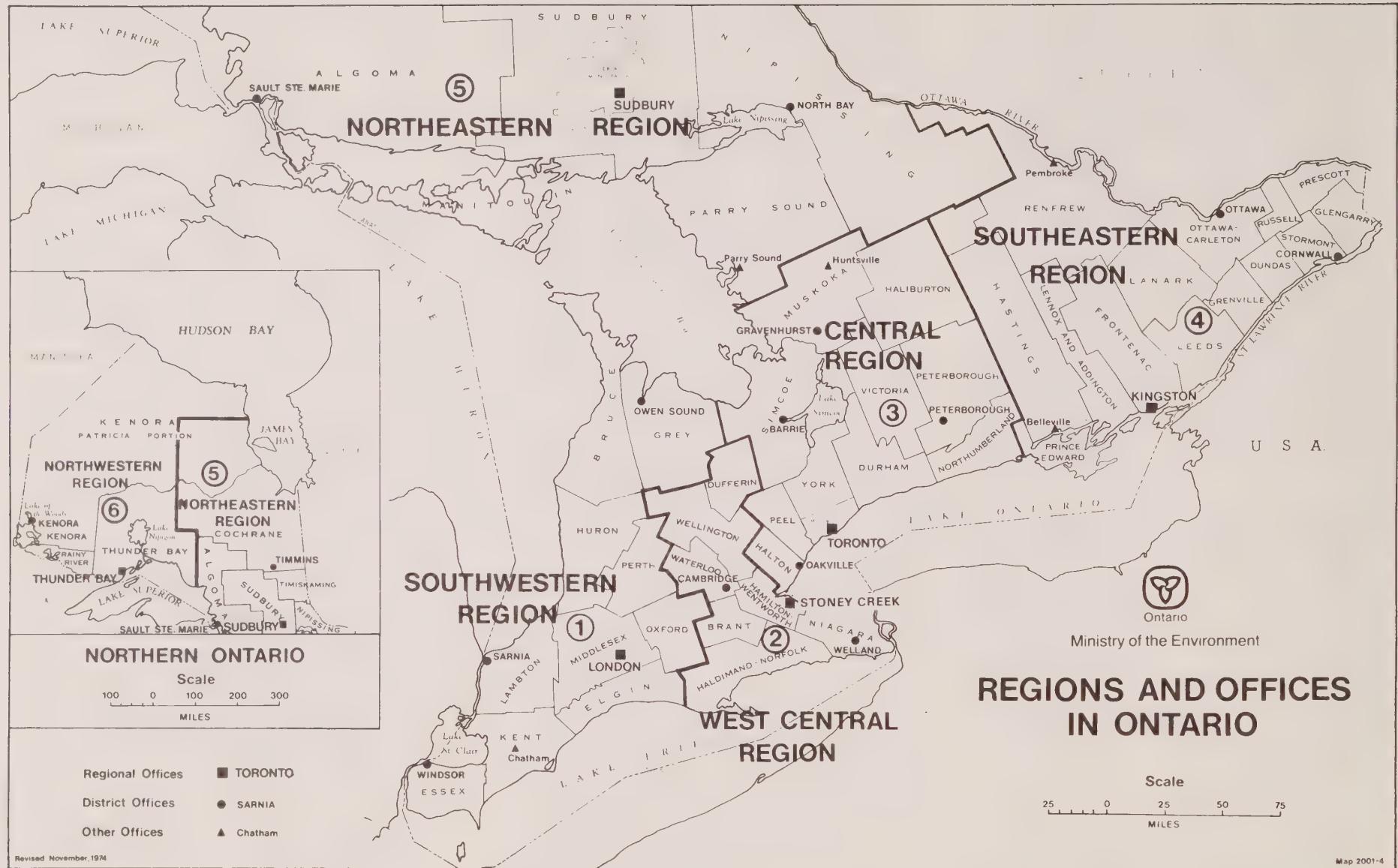
Used Oil Program

During 1978-79, 150 samples of waste oil were analyzed, and widespread PCB contamination was found. However, 96 per cent of the samples contained less than 100 ppm, and 90 per cent contained less than 25 ppm. These results indicated that most of the oil was acceptable for road oiling or as fuel in cement kilns consistent with waste oil guidelines.

A study of the environmental acceptability of used oil for dust suppression was extended through 1978-79 after the first phase of the study in 1977-78 produced inconclusive results. Second phase results appeared to be more definitive. On receipt of the consultant's report, the inter-ministerial committee on used oil recycling was to issue recommendations regarding the continued use of used oil for dust suppression on rural roads as well as for other uses.

Pulp and Paper Industry Investigation

During the fall of 1978, Ministry staff provided environmental and industrial expertise for Ontario's Task Force on the Pulp and Paper Industry. In January 1979, the Treasurer accepted the Task Force's recommendations and announced an incentive program for this industry. To receive a grant, a company must meet environmental and long-term mill viability requirements. Ministry staff are a part of the Advisory Group that reviews all grant requests. By year-end, nine companies had made submissions covering 20 mills.



Revised November, 1974

Map 2001-4

regional operations and laboratories division

Assistant Deputy Minister: W. B. Bidell

The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.

In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.

northwestern region

Regional Director: R. M. Gotts

Industrial Abatement

Industrial abatement activities in 1978-79 were primarily centred around extensive abatement programs required by Control Orders, Requirements and Directions, and Program Approvals issued to the Region's pulp and paper mills. Abatement programs were completed at three mills: by American Can of Canada Ltd. in Marathon (air), by Boise Cascade Canada Ltd. in Fort Frances (water), and by Domtar Packaging Ltd. in Red Rock (water). Additional abatement programs for these mills were being considered at year-end.

A new Control Order was issued for the Kenora mill of Boise Cascade Canada Ltd. for a major air and water pollution program to be completed by June 30, 1982. A Notice of Intent was served on Reed Ltd. for its Dryden mill for a Control Order to cover extensive abatement facilities required for an existing program. An Amended Requirement and Direction was issued to Great Lakes Forest Products Limited to allow additional time to resolve technical difficulties with the innovative closed-cycle effluent system in its new kraft mill.

A Control Order was issued to Steep Rock Iron Mines Ltd. for a monitoring and security program to ensure that PCBs from contaminated soil are contained in an existing, closed, environmentally secure, dedicated solid waste disposal site. At year-end, a Notice of Intent to issue a Control Order was

awaiting approval prior to being served on Industrial Grain Products Ltd. for a major abatement program to resolve air emission problems and excessive BOD_5 loadings in wastewater from its Thunder Bay starch plant. Progress continued with extensive air pollution abatement programs at the terminal grain elevators in Thunder Bay. By September 1979, it is anticipated that emissions from these elevators will have been reduced to approximately five per cent of pre-abatement levels.

Municipal and Private Abatement

Regional staff routinely inspected all communal water and sewage treatment facilities. They also conducted special surveys and studies, including bacteriological and chemical studies of water quality in municipal distribution systems, loading studies at sewage treatment plants, and water pollution surveys at a number of communities.

Major construction of water and sewage projects continued at various municipalities. Construction activity is expected to decline, as most municipalities have, or shortly will have, acceptable water and sewage treatment facilities. Construction projects of water and/or sewage treatment plants were completed or being completed at Kenora, Rainy River, Beardmore, Longlac, Nakina, Thunder Bay, and Geraldton.

Inspections were completed of all municipal and provincially-operated waste disposal sites in the Region. Funds from the Waste Management Improvement Program were used to upgrade facilities as required. Municipalities continued to participate in Project Remove, which has been essentially effected throughout the Region. In 1978-79, programs were carried out in the areas of Pickle Lake, Marathon, and Terrace Bay.

The Cottage Pollution Control Program was carried out along the north shore of Lake Superior. The Boating and Marina Inspection program was also continued, with particular emphasis on ensuring the adequacy of shore-based pumpout facilities.

More licences were issued under the Pesticides Control Program for brush and weed control programs, utility corridor maintenance programs, and forestry programs. General interest in pesticide use increased, as indicated by a public controversy over the use of 2,4-D in the forestry program in the Sioux Lookout area.

Air Quality

The Air Quality Assessment Unit continued major monitoring surveys in seven urban centres and issued reports for these areas for the year 1977. Special investigations utilizing vegetation, soil, and snow sampling techniques and direct air monitoring were also conducted near several forestry, mining, and grain elevator operations. The regional network of 130 instruments measured particulate pollutants, sulphation rate, sulphur dioxide, hydrogen sulphide, wind direction, and wind speed.

Water Quality

The Water Resources Assessment Unit operated a 47-station water quality monitoring network for lakes and streams in the Region (notably those affected by industrial and municipal wastes or urban run-off) and conducted regular sampling at 11 sites in support of the tributary monitoring program of the International Joint Commission for streams entering Lake Superior. Other major survey activities included participation in a joint federal/provincial study of mercury pollution of the Wabigoon/English River

systems; a pre-operational survey of the Mission Bay dredged-spoil disposal site in Thunder Bay; analysis of samples from wells in the Thunder Bay area for chemical quality; completion of surveys in the Red Lake and Sturgeon Lake areas to assess the impact of mining activities on surface water quality and biota; assessment on lakes in the Kenora area affected by the development of residences and summer cottages.

Environmental Planning

The Approvals and Planning Unit continued to co-ordinate regional responses to environmental impact statements and to review municipal subdivision proposals. In co-operation with the assessment units the use of magnetic tape data files was continued to improve Regional capability to retrieve, analyze, and interpret information collected at water and air quality monitoring stations.

Laboratory Operations

The analytical workload of the Thunder Bay Regional Laboratory was substantially increased by the added requirement in 1978-79 that soil and vegetation samples submitted from regional phytotoxicology surveys undergo chemical analysis. Analytical capabilities were extended significantly in order to accommodate this new area of chemical service.

Utility Operations

The Utility Operations Section operated 11 water treatment and 12 sewage treatment plants. Three new projects were commissioned during the year, and the transfer of operating responsibility of Kenora water and sewage treatment facilities to the Town of Kenora was initiated. Three additional projects

are to be commissioned and two new projects constructed in 1979-80.

northeastern region

Director: C. E. McIntyre

Industrial Abatement

Nine Control Orders, two Amending Control Orders, one Requirement and Direction, and two Provincial Officers Requirements were issued in 1978-79. The International Nickel Company of Canada Limited received three of these documents concerning their Sudbury operations: a Control Order, a Requirement and Direction, a Provincial Officers Requirement. As a result of earlier Control Orders, consultants completed assimilation studies on the Abitibi and Sturgeon Rivers. The studies were subsequently reviewed and abatement procedures agreed to by the companies concerned and the Ministry.

A Ministry-engaged consultant provided alternative solutions to the problem of PCB soil contamination in the Dowling area of Onaping Falls. At a public meeting, the Minister of the Environment announced that the situation would be remedied by means of hydrodynamic containment. Regional staff investigated 1507 complaints during 1978-79; of these, approximately 1400 were satisfactorily resolved.

Municipal and Private Abatement

The Region completed 62 lake and municipal surveys and visited 1683 cottages and residences to check waste supply and

sewage disposal systems—nearly a 50 per cent increase in such activity over 1977-78 due to the introduction of private services grants to municipalities. In total, 304 spills were reported and investigated; appropriate clean-up action was taken in each instance.

Under Project Remove, 19 municipalities helped to collect 3289 derelict motor vehicles. Nine municipalities participated in a program to improve their solid waste management operations. The Environmental Assessment Board hearings, held in Elliot Lake concerning proposed mining expansions, were finally concluded after nearly 30 months of public involvement.

Air Quality

A total of 200 instruments and recorders monitored air quality throughout the Region. In addition, special studies for particulate were conducted in Matheson, Parry Sound, Agnew Lake, Sault Ste. Marie, and Timmins. The suspended particulate and dust fall surveys in Elliot Lake were also continued to provide radiological data for use at Environmental Assessment Board hearings.

The Plant Pathology Unit collected over 1300 vegetation and soil samples throughout the Region and investigated 35 complaints of injury to vegetation. It was determined that 23 of the vegetation injuries were directly related to air pollution. The special white birch and white pine study, involving remote satellite-sensing and low-level photography, was continued to study the effects of air pollutants on vegetation in the Wawa area. The leaf litter decomposition study was continued in the Timmins area to determine the effects of zinc in the litter layers.

Water Quality

Water Resources staff completed a significant number of water quality projects, in-

cluding 12 groundwater interference/contamination investigations, 25 groundwater assessment studies, 40 water quality assessment studies, and 25 lake classification evaluations. In addition, 165 routine water quality monitoring stations and five routine water quantity monitoring stations were maintained.

Staff also provided reviews and assessments on 85 separate matters concerning official plans and amendments, lake management plans, the Public Lands Act, and zoning orders and processed 149 applications pertaining to pits and quarries under the Navigable Waters Protection Act and the Beach Protection Act.

Many groundwater interference and contamination complaints continued to be received. Major investigations were concerned with salt contamination of wells in Emsdale, gasoline contamination of wells in Port Loring, and water interference problems arising from a fish hatchery operation in Earlton. Staff verified 1200 water-well records, visited 110 well drillers, and issued 65 permits to take water.

Utility Operations

The Region operated 22 water treatment and 47 sewage treatment facilities, two of which were put into operation during the year.

The Region completed construction of the sludge dewatering system it had designed for the North Bay sewage treatment plant. The Region will operate the plant and use rented trucks for hauling sludge rather than rely upon a contractor. This arrangement should result in the City of North Bay saving more than \$6,000 in sludge disposal costs yearly. A sludge thickening tank was put into operation at the Sudbury sewage treatment plant that should save approximately \$22,000

a year in sludge disposal costs.

In co-operation with the Township of Black River-Matheson, the Region designed and constructed a new pumping station for the Community of Ramore. It was estimated that the use of governmental rather than private engineering and construction services for this project resulted in a cost saving of approximately \$30,000.

The Region initiated a study to determine the least expensive method to reduce the corrosive effects of water coming from the Wanapitei water treatment plant, which serves parts of the City of Sudbury and the Town of Nickel Centre. The study was undertaken after lead levels above provincial standards were found in water supply samples taken from older homes in the area with lead service connections.

southwestern region

Director: D. A. McTavish

Industrial Abatement

Work continued through 1978-79 towards establishment of a new regulation for control of sulphur dioxide levels in the Sarnia area. It appears possible to achieve air quality objectives for sulphur dioxide by curtailing sulphur oxide emission rates from certain industries during weather conditions that contribute to elevated sulphur dioxide levels in the area.

Regional staff are required to respond in the event of radioactivity-release incident at the Bruce Nuclear Power Development, which might have off-site effects. In mid-

March 1979, a two-day seminar was held at the site to familiarize staff with the facility, its surroundings, and their responsibilities for environmental monitoring in the area. Municipal representatives and the Medical Officer of Health for Bruce County attended the seminar.

Residents in rural areas surrounding the Tricil waste disposal site in Moore Township expressed concern about waste disposal activities at this site, especially following shutdown of the Mississauga incinerator. Extensive monitoring in 1978 included air sampling for both gaseous and particulate matter and measurements for soil and vegetation contamination. These studies showed that Tricil is not contributing to environmental contamination around the site to a detectable degree.

Work continued under the Transboundary Memorandum of Understanding by which air pollution control programs along the Detroit and St. Clair Rivers are integrated to the mutual advantage of both Ontario and Michigan. During 1978-79, procedures were established for companies to inform the appropriate municipal authorities in either country should a large quantity of toxic gas be accidentally released and appear likely to cross the international boundary.

There was a continuing increase in the number of applications for Certificates of Compliance for new and expanding livestock facilities. Many municipalities expressed an interest in receiving more information on the treatment of individual applications, and procedures were altered to provide this information. Some municipalities began participating in the program by providing the services of building inspectors; more are expected to follow suit.

The Region continued to receive complaints of dust emissions from grain-drying

facilities. At year-end, four grain dryers in the area were slated to be equipped with supplementary control equipment in 1979-80. During 1978-79 all drilling rigs in the lime industry were equipped to control dust emissions from quarry operations. At year-end, similar controls were being planned for quarry operations in the cement industry.

Municipal and Private Abatement

The Region participated in negotiations with the Ministry of Housing, a developer, and the Kent County Health Unit that led to the adoption of a development proposal for the entire western tip of the Erieau Peninsula, which had previously been owned by the C&O Railway in the United States and used for several decades as a coal depot. As a result of the proposal's adoption, existing residents of the area gained the opportunity to purchase lands they had occupied previously under 30-day lease arrangements with the Railway.

Discussions involving the Ministry, the public, and Lambton County health officials took place concerning difficulties being encountered in obtaining approval for the construction of septic tank systems in Lambton County. Regional staff, it was finally decided, would take over the approval and inspection of septic tank systems from the Lambton County Health Unit on April 1, 1979.

The Environmental Assessment Board approved an application by the City of Owen Sound to use a farm situated in the Township of Sydenham for the landfilling of domestic and commercial wastes.

Following discussions with the Town of Blenheim concerning odour problems arising from high-strength canning plant wastes being discharged into its sewage lagoon system, the Ministry indicated it would provide a design and \$100,000 for the construc-

tion of facilities capable of treating such wastes. At year-end, it was anticipated that the new facilities would be in operation prior to the 1979 canning season.

Air Quality Assessment

During 1978-79, the Air Quality Assessment Unit maintained 90 monitoring sites collecting pollutants over 30-day periods, 35 instruments collecting suspended particulates every sixth day for 24-hour periods and 68 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, based on the collection of 560,000 measurements. The Ontario Air Pollution Index was provided for Sarnia and Windsor.

Air quality monitoring was increased in the vicinity of the Bruce Nuclear Power Development site with the addition of an ozone monitor and suspended particulate monitoring for radiation. The main monitoring station in Sarnia was relocated to Centennial Park. A special study was initiated to determine the source and impact of particulates in the Beachville area.

The Unit documented the adverse effects on air quality of particulate emissions from Canron Limited in St. Thomas using correlations between levels of suspended particulates and meteorological parameters.

Approvals and Planning

The Approvals and Planning Unit reviewed 135 official plans, amendments, and zoning orders and forwarded comments on 110 of them to the Ministry of Housing. The Unit co-ordinated and provided regional input on 18 reports relating to sewage works and five reports concerning water supply and distribution systems. Fifteen applications were processed for Certificates of Approval to ensure compliance with air quality requirements.

Ninety-one water-taking permits were issued or renewed, and ten were cancelled. Regional input was provided on 11 environmental assessments (five formal), and appraisals were made of 71 development or land use proposals having environmental implications. The Unit also provided input on eight documents relating to land use planning and development guidelines, circulation and review procedures, agricultural practices, and the Niagara Escarpment Preliminary Plan.

Water Resources Assessment

By year-end, the Water Resources Assessment Unit had completed or was in the process of completing 21 reports outlining water quality assessments or establishing waste control requirements for surface waters throughout the Region. Surveys were conducted on ten watercourses or lakes to assess waste assimilation capacities, involving a complete range of water quality parameters and encompassing present concerns for hydrogen sulphide, ammonia, chlorine residuals, and heavy metal concentrations. Specialized efforts included assessments of marsh-type sewage lagoons at Harrow, investigations of the impact of fish hatchery effluents, sampling for Mirex on Kettle Creek, PCB sampling at Walkerton, and industrial lagoon sampling at Borden Company Ltd.

The water quality monitoring network was sustained, based on the collection of monthly water samples at 130 stations—seven of them involving continuous dissolved oxygen monitoring equipment. Streamflow measurements were taken regularly at 20 stations. Staff investigated 30 fish kills and assessed 12 surface water interference complaints. Continued progress was made to develop an experimental marsh treatment

facility at Listowel and apply soil renovation-type treatment approaches at Markdale and Flesherton. Specialized monitoring efforts involved bi-monthly sampling (December to May) at ten selected waste treatment lagoons to evaluate treatment efficiency.

Groundwater activities were again focussed on water quality and quantity complaints. Staff investigated 68 water-supply contamination complaints and 46 water-quantity interference complaints, the latter involving 274 residences. All complaints involved extensive field investigation and follow-up; several required letters to MPPs and the Ontario Ombudsman.

The Unit helped the Industrial Abatement Section assess the impact of 15 liquid manure holding facilities, locate waste disposal facilities at four sites, and evaluate the impact of two existing facilities. The Unit also provided advice on deep well disposal and maintained a monitoring program involving 30 observation wells in the vicinity of past deep-well disposal operations. Water-level fluctuations throughout the region were assessed by an observation well-network that included 38 wells equipped with automatic recorders and 16 wells where manual measurements were taken.

The Unit inspected 2,262 wells under the Water Well Program and reviewed and corrected an equivalent number of water well records prior to plotting on permanent map records. Thirty-seven per cent of the wells inspected were deficient in one or more respects. The Unit investigated 27 complaints of improper well construction and pump installations. Well-plugging guidelines were developed and distributed for review, and special assistance was provided to the Ministry of Transportation and Communications to ensure the plugging of numerous abandoned wells.

Water resources staff were involved in a total of 325 reviews of marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests, and various development proposals.

Laboratory Services

The London Regional Laboratory performed 150,364 chemistry tests on 16,436 samples and 41,658 microbiological tests on 15,386 samples.

A program to store and analyze quality control data on the mini-computer was finalized, involving transmission of data every six months to the Quality Assurance Officer for evaluation. The API multi-test bacterial identification system was put into use enabling more positive identification of bacteria at the genus and species levels. Total Dustfall and Carbon were added to the analysis program.

The microbiologist assisted the Municipal and Private Abatement Section and officials of the Ministry of Health in organizing and implementing a contingency plan to prevent the spread of polio virus in the environment. Efforts were focussed on disinfection of digested sludge and wastewater at activated sludge sewage plants in the area of a simulated polio outbreak.

Utility Operations

Two small waterworks systems and three small sewage treatment and collection systems commenced operations in 1978-79, thereby increasing the total population provided with water or sewage service by the Ministry from approximately 740,000 to 750,000. Two provincially-operated municipal plants were expanded by the municipalities concerned. Measures were initiated to expand eight sewage lagoon facilities that

failed to meet the Ministry's criteria for effluent concentrations because of overloading.

Negotiations for transferring operating responsibility for the Chatham Pollution Control Plant progressed satisfactorily; similar discussions with another municipality were also under way at year-end. Resolutions were received from four municipal councils repeating previous refusals to accept operating responsibilities for pollution control plants.

The Regional Utility Operations Section operated 57 sewage treatment plants and lagoons and 21 water treatment plants and well facilities in 1978-79. Its complement was increased by four full-time staff and two part-time staff. The Regional Safety Committee, comprising management and bargaining unit staff from all disciplines within the Region, continued to function satisfactorily.

west central region

Director: C. J. Macfarlane

Industrial Abatement

Dofasco and Stelco made a number of significant advances in their respective pollution control programs in 1978-79. Dofasco controlled charging emissions in a melt shop and completed the construction of a new coke oven equipped with the most modern pollution control devices in North America. The company also completed the exhaust air emission control of two blast furnace buildings. After much research and development work, Stelco installed an air cleaner of advanced design at its sinter plant; start-up problems, however, were not fully resolved at

year-end. Stelco also installed additional air pollution control devices at its coke ovens in Hamilton and completed the recirculating water system for the blast furnaces at its Hilton Works.

The new Texaco oil refinery at Nanticoke was in production at year-end. The most modern refinery in Canada, it was equipped with the latest pollution control devices.

Municipal and Private Abatement

The year was marked by major advances in the provision of water pollution control construction in the Grand River Basin. Completed expansion of the Kitchener Sewage Treatment Plant increased its nominal capacity from 13.5 million gallons to 27 million gallons per day. Expansion of the Waterloo plant (almost complete by year-end) increased its nominal capacity from 6 million gallons to 10 million gallons per day. The City of Brantford's plant was undergoing expansion at year-end from a nominal capacity of 12.5 million gallons to 18.5 million gallons per day. The City of Guelph undertook an advanced tertiary waste water treatment system intended to improve the quality of the effluent discharged to the Speed River and to permit development of the city. Plans were being made to expand and to improve present waste water treatment systems at Ayr, St. George, Elmira, Salem, Elora, and Shelburne.

Expansion of Hamilton's secondary waste water treatment plant from a nominal 60 million gallons to a nominal 90 million gallons per day was nearing completion at year-end. Expansions of treatment plants at Fort Erie (river plant), Simcoe, and Dundas were substantially complete; expansion of the treatment plant at Niagara Falls was well advanced.

Allegations of irregularities in industrial liquid waste disposal in the Hamilton area led to the laying of more than 100 charges by the Ministry against individuals and companies in the waste management field. The charges followed an examination of disposal practices in the Regional Municipality of Hamilton-Wentworth.

Public resistance to the establishment of sanitary landfill sites was evident at the Ontario Municipal Board (OMB) hearing into the proposed establishment of a disposal site in Glanbrook Township in the Regional Municipality of Hamilton-Wentworth. The OMB found in favour of the site being established. The Environmental Assessment Board hearing into the environmental aspects of the site was to commence in April 1979.

Air Quality

Air quality in the Nanticoke area was being monitored at year-end under a co-operative measurement program conducted by Ontario Hydro, Stelco, Texaco, Environment Canada, and the Ontario Ministry of the Environment. The intention is to provide detailed meteorological information for well-founded air quality management, especially within a range of approximately 80 kilometers. Air quality in this area has been affected for many years by sources of air pollution from the United States. It is important that air quality not be permitted to alter to an unacceptable degree or to cause unwanted effects because of the presence of the new industrial development at Nanticoke.

Water Quality

During the year, there was a great upsurge of public interest in the disposal of industrial and municipal wastes. The revelation that large quantities of industrial wastes had

been stored at the Love Canal, Bloody Run Creek, and other sites along the Niagara Frontier in the United States led to disquiet about river water quality and the effect of contaminated Niagara River sediments on fish. Surveys of water quality at Ontario communities, including Niagara-on-the-Lake, Niagara Falls, and Fort Erie, did not reveal the presence of unusual levels of toxic chemicals; however, the conditions of the river sediments were far from acceptable.

central region

Director: P. G. Cockburn

Significant activities included environmental planning, an air quality improvement program in the core area along Lake Ontario, environmental control activities in recreational areas, and the control of phosphorus inputs to waterways.

Industrial Abatement

The disposal of difficult-to-treat liquid industrial wastes continued to be a problem during the year. With the closure of the Beare Road landfill site in April 1978 and the Tricil incineration facility in Mississauga in July 1978, no overall disposal outlet remained in the Region. At year-end, much of the waste being generated by industry was being stored on-premise; a portion was being shipped to outlets outside the Region.

Surveillance and monitoring of lead industries continued during the year. Emission levels were largely satisfactory. Elevated emissions occurred around the Canada Metal

Plant in late 1978 and early 1979; by year-end, the company had initiated further control activity.

Responses to spills and emergencies continued to be time-consuming. A warehouse fire, involving stored pesticides, occurred in April 1978 at Oakville Storage and Forwarders Limited in Oakville and required much liaison with other agencies and this Ministry to effect a satisfactory environmental response. Spills of contaminants, such as gasoline and fuel oil, required immediate and positive action to prevent significant environmental damage.

Progress continued to be made in abating liquid and gaseous emissions to the environment. Union Carbide in Lindsay eliminated their liquid effluent problem by re-diverting wastes from Sinister Creek to an augmented municipal treatment facility. Eldorado Nuclear Limited in Port Hope installed leachate collection and treatment facilities at the Welcome disposal site. Chemical Developments of Canada Limited in the Township of Rama installed a wastewater treatment system to treat liquid wastes. Gulf Oil Canada Limited in Mississauga completed the requirements of a Control Order.

Municipal and Private Abatement

Recreational lakes surveys were undertaken in the Honey Harbour area of the Township of Georgian Bay and along the Severn River in the District Municipality of Muskoka and the County of Simcoe. In the Peterborough area, surveys were undertaken on Crystal, Pencil, Four Mile, White, Fortesque, and Salmon Lakes. A total of 2,350 cottages were inspected to insure that sewage treatment facilities were adequate for the purpose of protecting the quality of recreational waters. During the year, increased emphasis was placed on the upgrading of

existing waste management sites and the development of new sites where existing facilities were proving to be inadequate. The number of inspections in this area increased from 1,656 in 1977-78 to 1,817 in 1978-79.

A total of 2,200 inspections were made of water and sewage works to ensure compliance with Provincial requirements, based on an inspection frequency of two per year for waterworks and six per year for sewage works. Sewage works inspections were concerned, in part, with the control of phosphorus inputs to the water environment. The majority of plants were able to meet the 1.0 mg/l standard of the Canada—Ontario International Joint Commission Agreement; other plants required considerable assistance in upgrading their operations. One notable success story was the correction of a pH problem at the Gravenhurst sewage treatment plant that reduced the phosphorus loading to Gravenhurst Bay and eliminated a serious algae problem.

Air Quality

Major improvements in Toronto's air quality achieved over the previous ten years were maintained during 1978-79. The sulphur dioxide level in 1978 was lower than the 1977 level and well below the annual criterion. Suspended particulate remained slightly above the annual criterion. The API (Air Pollution Index) exceeded the maximum desirable level on only two occasions but did not reach the first alert level.

Monitoring for hazardous substances was continued in 1978-79. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Air-borne asbestos was monitored at five asbestos-using plants in the Region.

During the year, 34 applications were processed and approved related to environ-

mental emissions. Evaluations involved analysis of combustion equipment, plant, and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and other potentially hazardous substances such as TDI, MDI, PVC, and PCB.

Water Quality

Studies were carried out on a number of recreational lakes either to assess sensitivity to development or to establish a data base for long-term water quality trends. In Peterborough County, Central Region staff worked closely with municipal planners to establish the sensitivity of 16 lakes within the Seven Links Planning Area. In the District Municipality of Muskoka, a co-operative MNR-MOE lake survey program was undertaken to define the quality and sensitivity of five lakes for which these Ministries had very little data. The Region also continued its Self-Help program whereby cottagers and permanent residents on 73 lakes routinely collect their own water clarity data and take lake samples for chlorophyll analysis at the central laboratory. A review of this data suggested that, in general, the quality of most of the Pre-Cambrian lakes has remained reasonably constant over the past five years.

Considerable emphasis was placed on Lake Simcoe, the largest inland lake in Southern Ontario. Regional staff continued to monitor the lake's quality to establish long-term trends and participated on the interim ministerial Simcoe Couchiching Report Committee. During the year, the committee suggested that a basin policy be adopted for keeping Lake Simcoe quality at a constant level; at year-end, it was preparing its submission on the subject to the Cabinet Committee on Resource Development. Lake surveys were also carried out on Brydon Bay

(Lake Muskoka) and Gull Lake to check their suitability as water supply sources for Gravenhurst; both were judged to be suitable. A study was conducted on Sturgeon Lake to establish the effect of the enriched Scugog River, and a report was prepared detailing the 1977 survey on Little Lake near Barrie.

The Water Resources Assessment Unit paid increased attention to the impact of effluent discharges from sewage treatment facilities on receiving streams to determine whether the more stringent water quality objectives outlined in the new Water Management booklet were being met. Preliminary office studies were conducted for all such facilities discharging to streams in the Region, and specific field sampling runs were made on the summer and winter low-flow conditions for all plants in the southwestern part of the Region. Assessments indicated that, in many sections of streams, the ammonia and chlorine objectives were being exceeded during low-flow periods. Intensive field work at Uxbridge, Alliston, Stayner, Lakefield, and Cobourg found that the impacts of the facilities were generally acceptable.

As a result of proposed urban development in a number of municipalities, waste-loading requirements were established. Normal-to-high treatment was recommended for Cookstown, Victoria Harbour, Georgetown, Alliston, and Stouffville.

Regional staff provided assistance to the Water Resources Branch in defining the sensitivity of Muskoka-Haliburton Lakes for acid rain. The sampling of 29 lakes in early 1979 revealed that many of the Region's Pre-Cambrian Lakes have alkalinity values of less than 1 to 2 mg/l and are hence sensitive to acid precipitation.

The Muskoka Basin Mercury report, based on 1977 field-work, was prepared. It was con-

cluded that known direct inputs from human activities (i.e., sewage treatment plant discharges) could not account for the high mercury levels found in fish taken from the basin.

The Water Resources Assessment Unit investigated a number of complaints of ground-water contamination resulting from accidental spills and poor well construction and maintenance. The Unit also investigated complaints concerning lowered water tables, allegedly caused by major water withdrawals. A report on well interference in the Bolton area was released; at year-end, negotiations were under way for reimbursement of restorative costs incurred by owners of affected wells.

The construction of the York-Durham Sewage Scheme in the Boxgrove area resulted in numerous complaints about water quality and quantity problems being experienced with private wells. Regional staff helped to assess these complaints.

The hydrogeologic settings of a number of proposed and existing sanitary landfill sites were reviewed to determine their likely impacts on local ground and surface water quality through the production, movement, and attenuation of leachate. Sites investigated included Beare Road (Metro Toronto), Maple Pits (Town of Vaughan), as well as those in the Township of Seymour, the Town of Lindsay, and the Region of Halton.

Through the water well location and inspection program, 4,363 wells were located and the records submitted to the Water Resources Branch for processing. An inspection survey of 428 wells in the Region of York and the Muskoka and Haliburton areas showed about one-half of the wells to be deficient in one or more respects.

Eleven stream-flow recording stations were maintained, while periodic measurements

were made at 11 additional sites. Water quality samples were collected monthly at 189 stations with the help of the Credit Valley, Halton Region, Metropolitan Toronto and Region, and South Lake Simcoe Conservation Authorities. Radiological monitoring of surface water in the Township of Cardiff and at the Eldorado nuclear facilities in Port Hope and Port Granby was continued. Thirty continuous recording observation wells were operated in the Region to monitor fluctuations in groundwater levels.

Environmental Planning

Staff provided environmental planning expertise for the design and review of an increasing number of development proposals related to submissions under the Planning Act. Municipal liaison was increased in this area to assist the municipalities in Central Region that have assumed responsibility for the approval of such proposals from the Province. Liaison with private developers and their consultants was stepped up in order to introduce environmental factors at early stages of design. Staff assessed a number of class environmental assessment documents and assessment reports under the requirements of the Environmental Assessment Act and participated in a major environmental and feasibility study for locating a new provincial highway.

southeastern region

Director: R. E. Moore

Industrial Abatement

The Industrial Abatement Section investigated 137 spills and 195 complaints, performed 1,028 general inspections, and helped process 161 Certificates of Approval.

Several companies addressed themselves to pollution problems by installing equipment and making other modifications and improvements to their plants. The more significant actions were undertaken by

Courtaulds (Canada) Ltd. (Cornwall),
Lake Ontario Cement (Picton),
Celanese (Canada) Ltd. (Millhaven),
Canada Starch Co. (Cardinal),
Chromasco Ltd. (Haley Station),
Nestle's (Chesterville), and
Sanilit Ltd. (Alexandria).

Seventeen Orders, Requirements and Directions, reports, and prosecutions were initiated during the year.

Municipal and Private Abatement

Main staff efforts (on a percentage basis) were as follows:

- (1) inspection and assistance to operators of municipal and private waterworks (14 per cent) and sewage works (8 per cent);
- (2) inspection and assistance to operators of municipal and private waste disposal sites (14 per cent);
- (3) land use planning activities (10 per cent);
- (4) Part VII activities (12 per cent).

Increased emphasis was placed on the waste management program in 1978-79. The funding made available for the program was generally well received by Municipalities and led to several significant improvements being made. However, it is anticipated there will be increased resistance by citizens and municipalities in 1979-80 to the location of waste disposal sites in their areas.

The funding program for the correction of private systems was initiated; at year-end, reports were being prepared by consultants for 13 municipalities.

Stormwater management emerged as a major concern; at year-end, staff were negotiating a comprehensive study for the Rideau River and Ottawa-area communities. The study is to commence in 1979-80.

Water Quality

The Region's lake survey program continued with the sampling of 42 recreational lakes. Monitoring of water quality was carried out on an additional 69 lakes through the Cottagers' Self Help Program. Monitoring continued at 170 river water quality stations.

Staff investigated 27 interference and 63 contamination complaints concerning water supply and reviewed proposals for 34 new waste disposal sites and 36 municipal water supply and waste treatment facility expansions. Reports were also prepared during the year concerning water quality in the Bay of Quinte, water management on Mayhew Creek, and the enrichment status of the 69 lakes within the Cottagers' Self-Help Program.

Environmental Planning

The Region handled 1,572 requests regarding official plans and amendments, zoning by-laws, environmental assessments, certificates of compliance, ODC/DREE ap-

plications and sewage works approvals—an increase of approximately 26 per cent over 1977-78. There was also increased liaison with local municipalities, planning boards, consultants, and other agencies and ministries of government respecting this Ministry's input to urban, rural, and recreational land use planning.

Laboratory Operations

The Regional Laboratory in Kingston continued to offer key assistance to field operations. The chemistry workload on a test-performed basis increased by 10 per cent, while the microbiological test workload decreased by 10 per cent. The actual sample increase in chemistry was 20 per cent; in microbiology, five per cent. The reduced test workload was the result of an attempt to minimize redundant tasks, particularly in microbiology where the upper limit of capability is approximately 50,000 tests per annum or 15,000 tests per man-year. Seventy-five per cent of the workload in microbiology stems from municipal and private water supplies and Ministry-operated water treatment plant.

Utility Operations

Meetings with municipalities to discuss transfers of operating responsibility for Ministry water and sewage projects were notably unsuccessful. The majority of municipalities feel they cannot operate the projects at a significantly lower cost than the Ministry and maintain the same level of operating efficiency. The Region's practice of "satellitizing" the operation of a number of smaller projects from a central "parent" project has, in particular, proved to a cost-effective measure.

The Utility Operations Section completed formation of a Technical Services Unit to provide improved, co-ordinated services in the

electrical instrumentation field and to the operating projects and abatement and laboratory services.

The new Hawkesbury WPCP went into service in late 1978, thereby providing treatment to what had been the last untreated municipal sewage outfall on the Ontario side of the Ottawa River.

laboratory services branch

Director: G. C. Ronan

The Laboratory Services Branch provides analytical support to the Ministry's environmental quality assessment and pollution abatement programs. Prior to 1978-79, steady growth occurred in all areas, but, as new programs were launched and the Government's constraint program continued, no further expansion of analytical work could be accommodated.

A study of laboratory operations was completed during the year. Recommendations were made to form a Laboratory User's Committee and to reduce sampling for some programs on a selective basis to accommodate newly-emerging, high-priority requirements. Consequently, regions and management groups voluntarily cut back on some areas of sampling.

Branch Organization

The Branch continued to respond to client group's needs on the basis of the type of analytical service required. The Branch consists of seven sections:

- (1) The Water Quality Section conducts routine water and wastewater quality testing.
- (2) The Air Quality Section conducts metal and anion analysis on air, water, and biological samples.
- (3) The Pesticides Section conducts routine and non-routine pesticides testing and other organic analysis on all types of environmental samples.
- (4) The Organic Trace Contaminants Section conducts routine and complex organic analysis on water, air, and biological samples.
- (5) The Physical Methods Section performs physical and chemical analysis on environmental samples by non-destructive techniques.
- (6) The Microbiology Section determines bacterial levels in waters and wastewaters, identifies microorganisms, and conducts microbiological assessment of the mutagenicity of pollutants.
- (7) The Administrative Section provides personnel, financial, and general administrative services; operates the Laboratory and Research Complex safety program; administers the Central Stores for the Ministry.

Three regional laboratories in Thunder Bay, Kingston, and London operate under the general technical direction of the Branch; they perform microbiological and chemical analyses in support of regional programs in Northwestern, Southeastern, and Southwestern Regions respectively.

During the year, the Air Quality Section was re-organized and transferred from 880 Bay Street in downtown Toronto to newly renovated facilities at the main laboratory complex on Resources Road in Etobicoke.

Tests Performed

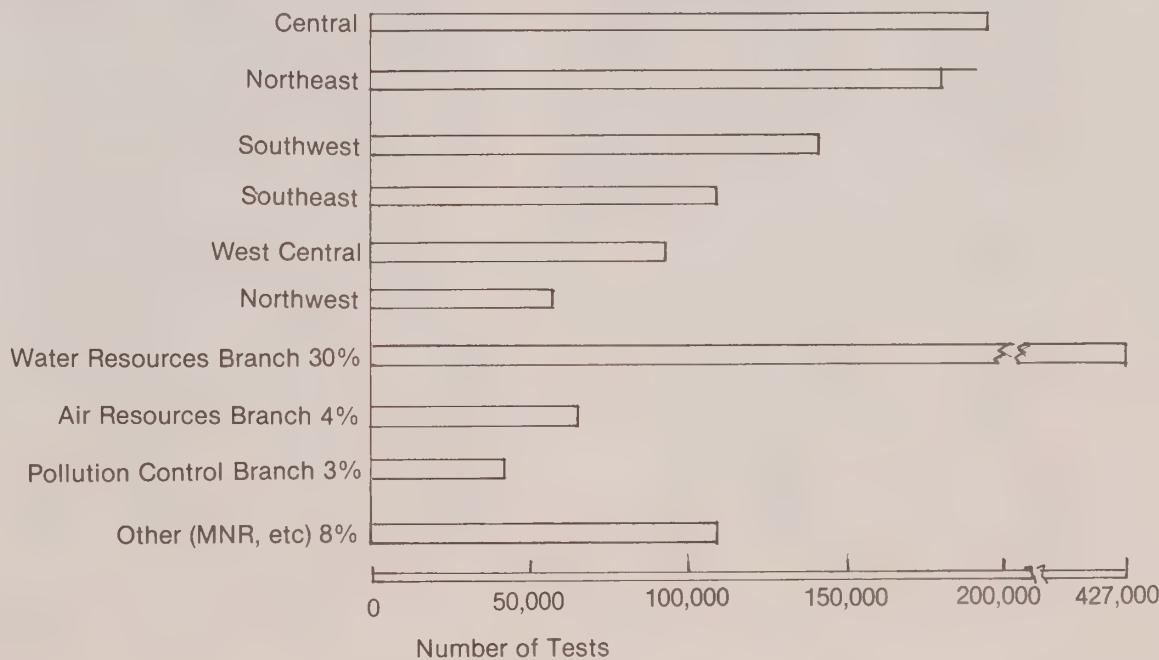
The Toronto and regional laboratories performed 1,702,000 tests in 1978-79 as compared to 1,780,000 tests in 1977-78, a drop in number of approximately four per cent. The Toronto laboratories conducted 75 per cent of the tests; the Thunder Bay laboratories, 6 per cent; the Kingston laboratories, 8 per cent; the London laboratories, 11 per cent. Table I (page 54) provides a breakdown of test production during the year as compared to the previous year.

Programs and Laboratory Users

The Toronto laboratories performed nearly 55 per cent of their tests in support of

Regions 55%

DIAGRAM 1: TEST WORKLOAD BY REGION/BRANCH, 1978-79



regional activities. The remainder were conducted for the Air Resources Branch (4 per cent), Pollution Control Branch (3 per cent), Water Resources Branch (30 per cent), other branches and governmental agencies (8 per cent). Diagram I illustrates the distribution of the workload among users.

Principal regional programs requiring laboratory tests were concerned with assessment or abatement activities (air and waste assessment, industrial abatement, water works monitoring). The majority of tests required by the Water Resources Branch were connected with its Great Lakes and river monitoring programs. Diagram II illustrates test volumes for specific programs.

DIAGRAM II
LABORATORY USERS AND PROGRAMS (CHEMISTRY TESTS)

		# Tests x 1,000
WATER RESOURCES		
BRANCH		
River Monitoring		166
Great Lakes		98
Limnology-Toxicity		36
Lakeshore Capacity		92
Groundwater Development		10
Grand River		16
Urban Lakes		9
Other		4
Subtotal		423
 AIR RESOURCES		
BRANCH		
Phytotoxicology		39
Air Quality		15
Other		9
Subtotal		61
 POLLUTION CONTROL		
BRANCH		
Wastewater Tech		16
Water Tech		10
Applied Science		17
Subtotal		43
 REGIONS		
BRANCH		
SES		53
Recreational Lakes		26
Air Assessment		99
Water Assessment		100
STP's		202
WW's		225
Self-Help		8
Industrial Abatement		68
Other		7
Subtotal		789
 OTHER GOVERNMENT		
BRANCH		
Federal		4
MOH		13
MNR		82
Other		16
Subtotal		115
Total		1,433

Major Analytical Surveys

As indicated in Diagrams I and II, numerous large-scale surveys were carried out in 1978-79. Major voluntary decreases in regional sampling requests occurred in the following areas: air assessment, waterworks monitoring, urban lakes testing, and vegetation analyses. STP and industrial abatement sampling remained at approximately the same levels as in the previous year.

There was continued high demand for air, water, and land samples to be analyzed for hazardous substances. Drinking waters from the province were analyzed for haloforms and volatile organohalides, and a wide range of organics were investigated in the second phase of the St. Clair River Study.

Fish continued to be frequently sampled indicators of water pollution. Over 4,500 fish were analyzed for PCBs; 13,000 for mercury. The "Guide to Eating Ontario Sports Fish" was based upon more than 50,000 fish analyses and provided information on 620 lakes and rivers.

Requests for the analysis of landfill materials and sites increased in 1978-79 especially with regard to leachate analysis, lysimeter studies, and possible legal actions. The PCB spill at Dowling continued to result in significant soil/sediment sample inputs.

The laboratories again received more than 15,000 testing requests apiece for lead, mercury, zinc, arsenic, copper, and cadmium. Demands for PCB analysis increased in number; demands for asbestos analysis nearly matched the output of the previous year and included an extensive survey of Ontario's raw and treated water supplies. Requests for detailed diagnostic analyses increased, placing heavy demands on sophisticated equipment systems.

Over 2,600 positive identifications of organic compounds were made using the

gas chromatography/mass spectrometry systems; nearly 4,500 tests were carried out on public complaint samples using optical scanning or transmission electron microscopy.

Automation of the x-ray fluorometer led to major increases in lead and sulfur testing. Automation of the ion chromatograph resulted in improved turnaround times for eight anions as well as sodium, potassium, ammonia, calcium, and magnesium.

The inductively coupled plasma was successfully applied as a spectral source for the emission spectrometer, thereby allowing over 130,000 multi-elemental tests to be made on sewage sludge and lake sediments.

Investigative Developments

The Microbiological Section established a virus laboratory and developed the capability for mutagen/carcinogen testing. Taxonomic identification systems were developed for a number of users, and two of the newer parameters (*Pseudomonas aeruginosa* and *Candida albicans*) were adopted for increased routine use.

The Microbiology and Organic Trace Contaminants Sections jointly initiated an intensive program for the recovery and concentration of trace organics for bacterial mutagenicity testing. The latter group also developed gas chromatographic methods for the analysis of C₁ to C₅ aliphatic hydrocarbons and aliphatic alcohols in ambient air, and ethylene in industrial emissions.

The Pesticides Section investigated:

- (1) methods of analyzing PCBs in human blood and adipose tissue;
- (2) techniques for studying airborne herbicides trapped on high-volume air samplers;

(3) "single-peak quantitative gas chromatographic" methods for PCB analysis;

(4) rapid extraction and cleanup methods for PCBs and pesticides in fish;

(5) integrative techniques using Florisil adsorbents for HCB, HCBD determination in ambient air.

Other lines of investigation continued on 1) the application of capillary gas chromatographs and mass spectrometry systems for resolution of complex organic mixtures at very high sensitivity and 2) the use of group separation techniques using high pressure liquid chromatography.

The Water Quality Section developed a procedure for the rapid determination of nitrate, sulfate, and ammonia on high-volume air filters and made various time-saving changes in several of their highly automated units. The Section also developed a procedure for the analysis of trace bromide in precipitation samples. Joint projects with Applied Sciences, Water Technology, and Wastewater Treatment resulted in the development of:

- (1) a field test for nitrate determination;
- (2) preservation approaches for nitrate on sewage intended for soil amendment;
- (3) colour tests in support of ozonation studies on waters containing manganese.

The Physical Method Section undertook a joint project with the Air Resources Branch to characterize pollution damage to vegetation, using x-ray mapping of elemental distributions over leaf surfaces. In other development work, methods were tested for

the use of Delbag filters as an optimum means of determining asbestos fibres in air.

In a joint project with the Air Quality Section, X-ray fluorescence was investigated as a possible tool for the analysis of metals in vegetation samples, which account for approximately 42,000 tests annually. Other methods being investigated include atomic absorption spectroscopy (AAS) and emission spectrometry (ES). ES, combined with the inductively coupled plasma, was developed as a multi-elemental direct-reading method for sewage sludge analysis and as a diagnostic technique, semi-automated with a programmable calculator.

Two new units were created in the Air Quality Section: an automated flameless AAS unit, which turned out 20,000 arsenic and selenium tests, and an autoanalyzer unit, which performed 27,000 tests on high-volume air filters and vegetation samples.

Automation of all data acquisition and analytical systems control was developed in the Mercury Unit and applied to arsenic analysis. Methods were also developed for:

- (1) cerium as a geological time indicator;
- (2) antimony in vegetation, soils, and air particulate matter;
- (3) lead by hydride generation as a sensitive water technique;
- (4) metals in precipitation and air filtering media, using graphite furnace-AAS techniques;
- (5) vanadium, boron, nickel, and other metals in biological fluids, using spectrometric techniques.

Shipping, Stores, and Safety

The Branch issued over \$600,000 worth of chemicals and glassware in support of Ministry activities. Inventory levels were in-

creased to include 1,300 stock items. Over 700,000 sample bottles and tubes were processed in the bottlewashing and sterilization area. Over 473,000 items (mainly samples) were handled by shipping and receiving.

The safety program was expanded to include:

- (1) a first-aid room equipped to meet Workmen's Compensation Board standards;
- (2) a monthly safety newsletter;
- (3) safety orientation tours for new staff;
- (4) routine monitoring of the ventilation system, fumehoods, material-handling and disposal methods, and radiation and hazardous vapour testing;
- (5) demonstrations in the use of fire-fighting equipment;
- (6) specialized surveillance for staff exposed under hazardous conditions to substances such as lead, mercury, PCBs, and suspected carcinogenic agents.

Other Activities

Quality control continued to be an important factor in all Branch operations. An estimated 80,000 additional tests were performed as part of a daily effort to validate and control analytical data being reported to clients. Numerous round-robbins were initiated, or participated in, by branch staff; many standard reference materials were created or tested; interlaboratory checks were performed as part of a continuous effort to systematize and maintain data quality control.

Laboratory personnel chaired and participated in numerous technical committees as Ministry representatives or as scientific resource staff. During 1978-79, they prepared

109 reports. Of these, 14 were presented at symposia or conferences; eight were released as official MOE publications, three were published in technical journals; and 84 were made available as technical reports.

The laboratory newsletter, *Analysis*, continued to provide information on Branch developments and projects. Readership interest continued to grow; by year-end, circulation had risen to 500 copies per issue.

finance and administration division

Executive Director: G. E. Higham

This Division provides a complete range of support services and control functions to the operating Divisions required for the efficient operation of the Ministry.

financial and administrative services branch

Director: W. D. Wood

Accounting Records, Appropriation, and Control Services

The Accounting Records, Appropriation, and Control Services Section is responsible for maintaining and improvising a comprehensive financial information system for the Ministry. The Branch is also responsible for financial and budgetary control functions for all Ministry revenues and expenditures as well as cashiering and cheque distribution services.

During 1978-79, in conjunction with Accounts Payable, the Section undertook efforts to integrate several computerized financial reporting systems in order to provide more timely and up-to-date information to its users and to maintain higher control standards.

Office Services

The Office Services Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, assets control, head office stockroom functions, the Policy and Procedures Manual, and telecommunications services. The Section also administers the Photocopier

Control Program established by Management Board in August, 1977.

Purchasing

The Purchasing Unit was restructured to facilitate the implementation of modern, progressive procurement techniques, and to create an effective and highly responsive service to clients in terms of quality, value, economy, and efficiency. During 1978-79, the Unit received 10,943 requisitions and issued 10,166 purchase orders for a total of \$39.2 million.

Systems Development

The Systems Development Section continued work on a wide variety of systems in conjunction with Ministry Branches and Regions.

A study of the Nanticoke Environmental Management Program was carried out with the Air Resources Branch to determine the feasibility of acquiring a mini-computer for on-line data acquisition and modelling purposes. Development and implementation of the system will take place in 1979-80. A Nanticoke data storage and retrieval system based on the Air Quality Information System was developed and implemented. Development of the Hazardous Contaminants Inventory System was initiated upon completion of a feasibility study. The Air Quality and Meteorological Information System was modified and extended.

In conjunction with the Water Resources Branch, the Water Quality Criteria Violation Reporting System was developed and implemented. The Sample Information System was extended to accommodate data from the Limnology Information System. At year-end the Water Quality Simulation Model, developed originally for the Thames River Basin to examine the effectiveness of various water

management alternatives, was being modified and extended for use in the Grand River Basin.

The Utility Water Pollution Monitoring System was extended to meet additional reporting needs of the Pollution Control Branch and to allow for the metrification of water and sewage plant data.

An equipment supplier for the Laboratory Information System was selected. The system, which utilizes a mini-computer to process sample submission and results data, will be developed and implemented in 1979-80. Various steps were undertaken to facilitate program and data exchange between the Regions and Head Office. The Reconciliation Module of the Liquid Waste Way-Bill System was developed with the Waste Management Branch.

In conjunction with the Financial and Administrative Services Branch, the Section developed and implemented the Provincial Billing System. The first automated billing was to be produced for the service month of April 1979. A series of additional features was added to the Utility Rate Information System in order to reduce the manual effort required to enter data into the system and to improve the editing and updating routines. A study was carried out in the Financial Services area to assess the impact of the new automated Accounts Payable System being introduced, and changes were made to the COBIS system to allow for the necessary interfaces between the two systems.

Overall, the Systems Development Section was re-organized, and new staff were brought on board. The new Systems Development Methodology adopted by the Ontario Government, Spectrum-1, was introduced and was being implemented at year-end. A project control system, PAC 11, was implemented.

Systems Operations

The Systems Operations Section accepted the limnology and toxicity module of the Sample Information System and placed it on an operational basis. The line speed of the Remote Job Entry (RJE) computer terminal was doubled by installation of Timeplexor lineplexers, thereby greatly improving the performance of RJE components, especially the tape drive. Plans were finalized to move COBIS (including the Accounts Payable subsystem) to the Downsview Computer Centre from the Queen's Park Computer Centre.

Capital Financing and Revenue

The Capital Financing and Revenue Section administers the financial aspects of the Province's investment in water and sewage works projects and cost-sharing agreements and acts as financial consultants to Ministry branches and municipalities.

In 1978-79, the Section started automation of the billing and reporting systems and conversion to the metric system. A computerized billing system for provincial water and sewage works, which will produce invoices using metric units, was completed and tested for implementation April 1, 1979. The Section conducted 90 service rate reviews, of which 89 were successfully negotiated with municipalities.

Accounts Payable

The Accounts Payable Section processes for payment all supplier accounts, grants, subsidies, and employee travel expense claims. In 1978-79, 111,772 lines of input were processed for budgetary expenditures amounting to \$73.1 million and disbursements and charges amounting to \$150.3 million.

legal services branch

Director: J. N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

During 1978-79, the highest fine assessed under Ministry legislation was \$26,500 against York Sanitation Company Limited. The company, which operates a waste disposal site at Whitchurch-Stouffville, was convicted on 11 counts of failure to comply with the conditions of a provisional certificate of approval with respect to the amount of refuse they may receive, and on 31 counts of furnishing a Provincial Officer with false information (i.e., misstating amounts of waste received for disposal purposes). A case prosecuted in Ottawa resulted in the first trial ever to be held in French under Ontario's environmental legislation.

During the year, legal staff handled 72 cases before the courts under The Environmental Protection Act, The Ontario Water Resources Act, and The Pesticides Act. Of these, 32 resulted in conviction; four, in acquittals. the remaining cases were still before the courts at year-end. Staff also

handled a number of minor offenses under the boating regulation.

Other legal services included: acting as counsel in arbitration hearings under construction contracts; advising on the appropriate application of the Ministry's powers; advising on the form of documents and orders that can be issued by directors; providing legal advice to operating branches; preparing Orders-in-Council, regulations, contracts, and orders.

regular advisory council meetings, and development of a Ministry newsletter dealing with Affirmative Action.

The Central Agency mandate for the completion of broadbanding projects resulted in the activities of personnel officers being restricted to work associated with the creation of new job descriptions and the classification of all positions within the Management Compensation Plan Modules. At year-end, projects were reasonably on schedule; however, it was clear the Central Agency request for completion by October 1, 1979 would not be met.

The impact of a new program of staff utilization within a Branch/Region (based on the Classified Structure Ceiling of a Branch/Region) resulted in considerable consultation with management as to the most effective utilization of allocated funds.

On instructions from Management Board, the Ministry changed over to a computerized attendance reporting system during the year. Personnel staff operated the system and trained other branch and regional staff in its functioning. A parallel manual system was maintained to help accommodate certain attendance-reporting peculiarities within the Ministry, but it was anticipated at year-end that it would be dropped in 1979-80.

personnel services branch

Director: R. E. B. Burns

The activities of the Personnel Services Branch were largely determined by the Central Agency in 1978-79 as a result of 1) the mandate that broadbanding be completed during the latter part of 1979 and 2) a change in staffing policy to accommodate surplus staff from other Ministries. New manpower policies dealing with the employee appraisal, central attendance Classified Structure Ceiling impacted on developmental activities within the Branch; Programs had to be effected with fewer staff as a result of the Government's constraint program. The Branch continued to administer management development programs with courses being held in out-of-town locations.

The appointment of a new Women's Advisor resulted in several new directions being taken in connection with the Affirmative Action Program: the institution of the Ministry Women's Advisory Council, the request for the completion of an individual Affirmative Action Program questionnaire, the holding of

Training and Certification

The Training and Certification Section is responsible for the Ministry's technical training program in pollution abatement and control and, in conjunction with other agencies, the certification programs for Ministry and non-Ministry personnel.

During 1978-79, the Section conducted 27 courses, workshops, and seminars. Two new workshops were included in the program. A total of 670 Ministry and 679 non-Ministry personnel were trained. Thirty-eight trainees

attended from provinces other than Ontario. Of the Ministry staff, 74 were recertified in the identification of opacities of visible emissions, while five were successful in obtaining initial certification. Fourteen trainees were certified as Noise Control Officers Class I after completing Parts I and II of the Acoustics Technology Course. Of these, seven were employees of the Ministry; five were Municipal employees; two were from industry.

The Ministry participated with the Ontario Municipal Engineers Association and other organizations in the development of a program for the voluntary certification of water and waste-water utility operators.

Development of the education centre at the Ministry's Experimental Facility, Brampton, Ontario was continued. Additional classroom, laboratory, and workshop facilities are planned; construction is to start in 1980-81.

Safety

The Safety Unit provides for the development and co-ordination of the Ministry's safety program through the production and updating of the Safety Manual and liaison with external safety agencies and organizations.

Sections on laboratory, boating, and scuba diving activities were added to the Safety Manual during the year. Training was given on entry to confined spaces, chlorine handling, and operator safety at water works and sewage treatment plants. Liaison was maintained with the AWWA on safety aspects. Work continued with the Canadian Gas Association on Bulletin 105 (Handling of Digester Gas). The new Occupational Health and Safety Act was under review at year-end with regard to the revisions to be made to the safety policy and practices of the Ministry.

General staffing activity during 1978-79 remained consistent with the previous two years. Approximately 150 competitions were held despite the deleting of many positions. A new form of interview evaluation was designed, tested, and implemented for plant operations staff during the year. A similar form was designed for all other Ministry staff.

Negotiations for the transfer of water and sewage treatment plants to municipalities continued during 1978-79.

Contract administration activities remained at a constant level; the number of grievances lodged at the first two steps of the process increased, however, as management and union staff alike become more familiar with the administrative processes involved in working with a collective agreement.

The number of Ministry employees attending courses run by the Central Agency decreased somewhat during the year; however, attendance at Ministry-sponsored courses in management development and the interview process increased. These courses are administered by the Personnel Services Branch using outside consultant services.

and waste management. The Branch performs operational evaluation studies to assess the effectiveness and efficiency of Ministry programs and to achieve a rational allocation of resources. The Branch also develops the multi-year plan and acts as liaison with the Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

In 1978-79, the Branch conducted major studies and projects with regard to:

- (1) the pollution control equipment manufacturing industry in Ontario;
- (2) abatement priorities in the pulp and paper industry;
- (3) increased municipal responsibility for operation of water and sewage works;
- (4) opportunities for regulatory reform;
- (5) the application and extension of Ministry program indicators, as part of the continued development of the Management-By-Results technique.

To meet the requirements of central agencies and internal priorities, the Branch became increasingly involved in evaluating the economic and financial impacts of proposed and existing environmental policies and programs.

program planning & evaluation branch

Director: A. Castel

The Program Planning and Evaluation Branch analyses Ministry policies and coordinates the development of policies for environmental assessment, pollution control,

internal audit branch

Director: E. F. Heath

During 1978-79, the Internal Audit Branch carried out a comprehensive program of financially-oriented audits throughout the Ministry to evaluate:

- (1) the accuracy of Ministry records;
- (2) staff compliance with established and approved policies, guidelines, and procedures;
- (3) the effectiveness, efficiency, and practicability of the systems of internal controls designed to protect the Ministry's assets, revenues, and expenditures.

The Branch also performed audits with regard to:

- (1) revenues, expenditures, and disbursements, including grants, bursaries, and financial transactions with other ministries and outside agencies;
- (2) regional office operations;
- (3) the attendance reporting system and records.

The Branch performed in-depth reviews in the area of recoverable and accountable advances and continued to review new systems, procedures, and proposed controls with staff of other branches.

information services branch

Director: R. J. Frewin

The Information Services Branch continued to provide a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year, the Branch produced and distributed 117 news releases and a wide range of publications, reports, speeches, newsletters, and printed educational materials.

Prominent among the publications were three booklets entitled "Guide to Eating Ontario Sport Fish" of which 135,000 copies were distributed to the public. The booklets resulted from the on-going fish-testing program being carried out in co-operation with the Ministry of Natural Resources and medical advisors of the Ministry of Labour's Occupational Health and Safety Division. Updated and issued annually, the booklets contain analyses for possible contaminants in various species of fish from more than 450 Ontario water bodies. Monthly bulletins are also issued.

A major highlight of the year was "Operation Skywatch," a program involving volunteer women pilots in airborne environmental patrols to search out and report on unusual environmental conditions. The program was launched on an experimental basis in the Ministry's Central Region; on the basis of its success it was being expanded at year-end in conjunction with the "Ninety-Nines Inc." (the international organization of women pilots founded by the late Amelia Earhart) to other areas of the province where the Ninety-Nines have chapters. Approximately 85 women pilots are to be involved in the 1979-80 program, flying missions over the Ministry's four southern regions, including shoreline routes

along the Ottawa and St. Lawrence Rivers, Lake Ontario, Lake Erie, Lake Huron, Georgian Bay, Lake St. Clair, and the Detroit River.

Branch staff also continued regular aerial surveillance and photography on behalf of Legal Services and the technical branches. The photographic reports and surveys obtained were used as exhibits at hearings of the Environmental Assessment Board and as evidence in Ministry legal proceedings.

For the fourth year, Environment Ontario participated with the Ministry of Health and local officers of health in a mosquito-control information program aimed at controlling the breeding of mosquitoes. The joint program is intended to advise the public of measures that can be undertaken to prevent the breeding of mosquitoes and to provide information on viruses that can be carried by some species. More than 500,000 pamphlets, in both English and French, were distributed, and an extensive advertising and publicity campaign was conducted.

In co-operation with Environment Canada, the Branch organized public meetings in Windsor and Toronto on behalf of the Great Lakes Water Quality Board of the International Joint Commission. The meetings were held to stimulate public interest and to provide information with regard to the renewal of the 1972 Canada-United States agreement on water quality of the Lakes.

Branch staff participated as active members of the Communications Committee of the Ontario Government's Nuclear Contingency Committee. A day-long exercise, based on a simulated situation, was carried out under the direction of the Interministerial Control Group in October 1978. It was the third such exercise conducted since 1975.

The Branch co-ordinated a series of public information "open-houses" in Mississauga to provide residents with full information on a

proposal to burn PCBs at the St. Lawrence Cement plant. The open-houses provided an audio-visual documentary and published materials; Ministry scientific staff and medical experts from the Ministry of Labour responded to questions and comments from the public.

The Branch co-ordinated communications activities and arrangements for: the 25th anniversary meeting of the Industrial Waste Conference; the official opening by Premier William G. Davis of Ontario's Resource Recovery Centre and experimental plant in Downsview; the York-Durham Water and Sewage Treatment Project (the largest development of its kind in the province), which was under construction at year-end.

The documentary film, "Lake Odyssey," concerning the Ministry's experimental weed-harvesting program in the Kawartha Lakes, was shown at commercial theatres in Toronto, St. Catharines, Hamilton, Peterborough, London, and Kingston.

Two other movies intended for general public viewing were completed during the year. "River Under Ground," a documentary by four Ryerson student film-makers on the building of the York-Durham service system, shows how environmental and social responsibilities are related to major construction works. "A Matter of Common Sense" illustrates one family's approach to controlling and recycling the solid wastes generated in the home.

During the year, Ministry films were used in 690 showings to 24,231 people. In addition, four films were booked for a total of 20 showings on television where they were seen by a viewing audience estimated at 200,300. The Ministry's environmental films are available to the public from Modern Talking Pictures Services, Willowdale, Ontario. The Branch also produced a film for the training arm of

the Ministry. Entitled "Under Ground Connection," it is concerned with the proper installation and inspection of septic tanks.

A highlight of the Branch's educational program was the second Environmental Studies Workshop for Special Education Teachers held at the Bolton Outdoor Education Centre. The workshop was designed to introduce teachers who are working with handicapped children to environmental activities that can be conducted with their students. Forty teachers attended the workshop.

Two teams of four university students, trained for the summer environmental education program, conducted environmental studies with the public at 25 provincial parks, 21 summer camps, ten schools and two senior citizens' homes across Ontario. Film and talk programs about the Ministry of the Environment were also presented in the evenings at the provincial parks visited. An estimated 3,000 children and adults participated in this program during its 14-week period.

The Branch provided support to the Ministry's six Regions, including participation in 15 exhibitions and fairs and the staging of official plant openings for seven new water and/or sewage treatment facilities completed during the year.

The Ministry was also represented by exhibits featuring resource recovery, garden composting of garbage, pesticide safety, and other graphic displays and films at the Canadian National Exhibition, the Ottawa/Central Canada Exhibition, the International Plowing Match, the Western Fair in London, Dockside '78 at Ontario Place, the Royal Winter Fair, the "Do It Yourself" show in Toronto, and exhibitions at Thunder Bay and Sault Ste. Marie. The exhibits and the new "Enviro-theatre" served an estimated total audience of about 800,000.

Production of brochures and "Fact Sheets" was expanded, and 12 new titles were added to bring the number of publications distributed by the Branch to 77, plus 19 teaching aids for schools. Approximately two million pieces of literature were distributed in 1978-79.

The Library Services Section, consisting of both the main library at 135 St. Clair Ave. West in Toronto, which serves Ministry staff and the public, and the Laboratory Library on Resources Road in Etobicoke, which serves the Ministry's scientific staff, responded to 8,939 reference questions, loaned 16,238 books, and processed 50,747 photocopies of information material during the year. The libraries also acquired 4,458 technical books and documents, subscribed to 265 journals, which were widely circulated throughout the Ministry, and conducted 462 computer searches for scientific material. Using a new service from the National Technical Information Service, known as Selected Research in Microfiche, the libraries acquired 4,458 U.S. Government documents on the environment, which will help Ministry scientists keep updated in their respective fields.

boards and commissions

The Waste Management Advisory Board

Chairman: R. H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

The Board, comprising 11 members of diverse backgrounds and interests, held 11 meetings totalling 19 days in 1978-79. Through a formal system of priority-grading, the Board identified new areas of concern, undertook a variety of activities, and made recommendations to the Minister on a wide range of subjects in the waste management field. These activities were carried out by staff and consultants under the guidance of six Board Committees.

Concerned with ever-increasing complexities of waste management problems, the Board conceived of the need for a strategic waste planning process and commenced work on its development. Such a process would provide the Ministry with a tool for coping with all of the implications of establishing long-term priorities, and the means for dealing with crises before they occur.

The Board maintained, and in some instances, expanded its liaison with the paper, .

general packaging, milk, and soft drink industries during the year. These activities aided in the acquisition of data, broadened channels of communications, and resulted in the further dissemination of Ministry policy and intent.

With a view to improving governmental waste management practices, the Board initiated a study of current practices at the provincial level; developed and tested a new standardized cost accounting system for waste collection, recovery, and disposal at the municipal level; and participated with the Ministry of Correctional Services in an analysis of the feasibility of adopting source separation procedures in Ontario prisons. The Board feels strongly that governments should improve their own waste management practices before asking others to do so.

The Board continued its research into residential and commercial source separation, which it considers to be a valuable low-technology component of waste management. Work in this area during the year included a state-of-the-art assessment of source separations; feasibility studies on residential, institutional, and commercial composting; development of an approach, involving intermediate handling stations, to make the separate collection of source-separated materials more economical; and a study into the economics of corrugated carton recovery.

In the area of educational programs the Board undertook a project to determine the feasibility of recovering used motor oil from the "do-it-yourselfer" sector in Kitchener-Waterloo; initiated an environmental packaging design competition for students of post-secondary schools; and developed guidelines for office waste paper recovery programs.

Other Board work initiated or on-going during the year included: a study of the fiscal

and regulatory methods of reducing the environmental impacts of urban waste; an investigation of attitudes towards post-consumer products; an assessment of the Ontario waybill system for liquid industrial wastes; a survey to determine recovery rates for waste news in three communities in which separate waste news collections were being carried out; the production of an overview report on previous packaging studies; and continuous work related to carbonated soft drink containers, milk packaging, and wine and spirits packaging.

The Board's recommendations to the Minister of the Environment during the year were concerned with the Ontario waybill system for liquid industrial wastes, paper recycling, and carbonated soft drink containers.

In October 1978, the Board underwent a review by the Standing Procedural Affairs Committee, an all-Party committee established to examine the operations of the Province's agencies, boards, and commissions. The Committee recommended that the Waste Management Advisory Board "should continue in its present form" and that "the Ministry of the Environment should consider expansion of the Board's terms of reference to include liquid wastes."

The Environmental Assessment Board

Chairman: D. S. Caverly

The Environmental Assessment Board conducts public hearings under The Environmental Assessment Act, The Ontario Water Resources Act, and The Environmental Protection Act. Hearings are also held by the Board under Orders-in-Council as directed by Cabinet.

Board membership on March 31, 1979 was comprised of seventeen persons, including two new members who were appointed to the Board during the course of the year—Mr. V. M. Seabrook, Q.C., of Toronto and Mr. K. H. Sharpe of Mississauga. The Chairman is a full-time member of the Board; other members serve on a part-time basis.

During 1978-79, the Board conducted 13 hearings under The Ontario Water Resources Act and nine hearings under The Environmental Protection Act. Reports on six additional hearings, which took place prior to 1978-79 (four under the Environmental Protection Act and two under The Ontario Water Resources Act), were also submitted to the Ministry in 1978-79.

The hearing into uranium mine expansion in the Elliot Lake Area, held under Orders-in-Council Nos. 2681/76 and 2996/76, which commenced in November, 1976, was concluded on March 1, 1979. A further hearing under Orders-in-Council Nos. 527/78, 2333/78, and 449/78 concerning the burning of polychlorinated biphenyls at the St. Lawrence Cement Company in the City of Mississauga commenced on March 6, 1979 and will extend into 1979-80.

The Pesticides Advisory Committee

Chairman: Dr. D. N. Huntley

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the Act, its regulations, and government publications concerning pests and pesticides. The Committee also enquires into matters relating to pesticides and the control of pests as deemed necessary or as prescribed by the regulations.

In 1978-79, the Committee consisted of 16 members representing agriculture, industry,

universities, and government. The appointment of Mr. Ron Cameron, Thamesville, Ontario, and the resignation of Dr. R. Dorland, Ministry of Health, were the only membership changes.

The Committee recommended several changes to Ontario Regulation 618/74 as reflected in O. Reg 575/78, O. Reg. 132/79, and O. Reg. 160/79; reviewed and evaluated the environmental impact, toxicity, and hazard of six new pesticide active ingredients; reassessed six previously classified compounds; evaluated 283 newly registered pesticide products and recommended for each a classification for storage, sale, and use in Ontario. Classification guidelines were updated and released to registrants in January 1979. A number of investigations were carried out relating to phenoxy herbicides and their uses in Ontario. Recommendations were submitted to the Minister.

The Committee continued a research program established in 1973 with three major objectives:

- (1) to find alternative pesticides for those deemed environmentally hazardous and those restricted in use;
- (2) to determine potential environmental hazards with pesticides currently in use;
- (3) to reduce pesticide input into the environment.

The Committee received 41 research proposals, 21 of which were funded by the Ministry through the Committee at a total of \$446,300. Two research seminars were held at which fund recipients presented progress reports. The first seminar, dealing specifically with bird studies, was held in November 1978; the second, relating to all other projects, in January 1979. The annual assessment of pesticide research projects funded through the Committee was prepared and submitted to the Ministry.

All 1978-79 publications of the Ministries of Agriculture and Food, Environment, and Natural Resources, which were concerned with pesticides, were reviewed and endorsed prior to printing and distribution.

The Environmental Appeal Board

Chairman: Lois C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The Board consists of twelve part-time members, including the Chairman, from various occupations and parts of the province.

In 1978-79, the Board received 62 valid appeals. Sixty-five percent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, sewage treatment works, waterworks, and air pollution control.

The Board held 33 days of hearings in 1978-79. It resolved 35 of the appeals received during the year as well as 13 appeals from the previous year. At year-end decisions remained to be issued, or hearings held, on 27 appeals.

The Pesticides Appeal Board

Chairman: James R. Swanborough, Q.C.

Established under The Pesticides Act, 1973, the Pesticides Appeal Board provides a mechanism of appeal for persons affected by Ministry of the Environment decisions re-

garding the licensing of pest control operators and exterminators and the use and control of pesticides. The Chairman and members serve on a part-time basis.

One appeal was received in 1977-78 and was withdrawn by the appellant after a hearing before the Board.

The Board also heard one appeal from the previous year concerning the Ministry's refusal to renew an exterminator's licenses. This appeal was allowed by the Board after hearing two days of evidence.

The Farm Pollution Advisory Committee

Chairman: O. Crone

Made up of four farmers, the Farm Pollution Advisory Committee provides objective assessments of farm environmental situations as requested by Ministry officials. The Committee visits farms to investigate complaints and makes recommendations, where deemed necessary, concerning manure storage and spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

The Committee visited ten farm operations in 1978-79: four hog farms, three beef ranches, two chicken farms, and one mushroom farm. The Committee recommended improvements in structure and/or operational practices with regard to six of the ten farms visited. A major problem continues to be non-agricultural development near intensive livestock and poultry operations.

The Royal Commission on the Northern Environment

Chairman: J. E. J. Fahlgren

In April 1978, the Royal Commission on the Northern Environment published an Interim Report on the activities of the Hartt Inquiries. In December 1978, the Royal Commission published an Issues Report that identified problems and opportunities related to environmental concerns both adjacent to and north of the 50th Parallel.

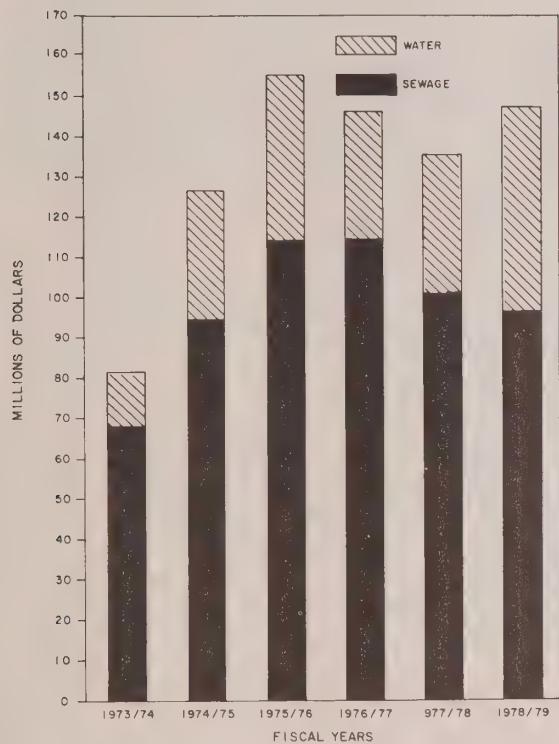
As a result of Justice Hartt's interim recommendations, the Indian Commission of Ontario was formed, and Mr. Justice Patrick Hartt was appointed its chairman. On August 2, 1978, Premier Davis appointed Mr. J. E. J. Fahlgren as Mr. Justice Hartt's successor; in October 1978, Commissioner Fahlgren publicly announced his objectives and work program. A formal organization was structured; qualified personnel were recruited; and offices were opened in Timmins and Thunder Bay in October 1978 and March 1979, respectively, to service northern communities.

November 1978, the Royal Commission implemented a public interest subsidy program aimed at public education and involvement and the preparation of submissions to the Commission. The program was concluded on March 31, 1979 by which time \$72,271 had been distributed to public interest groups and individuals.

The Commissioner and his immediate senior staff undertook a series of introductory visits to remote, northern native communities. The visits were made in seven stages and included approximately forty communities.

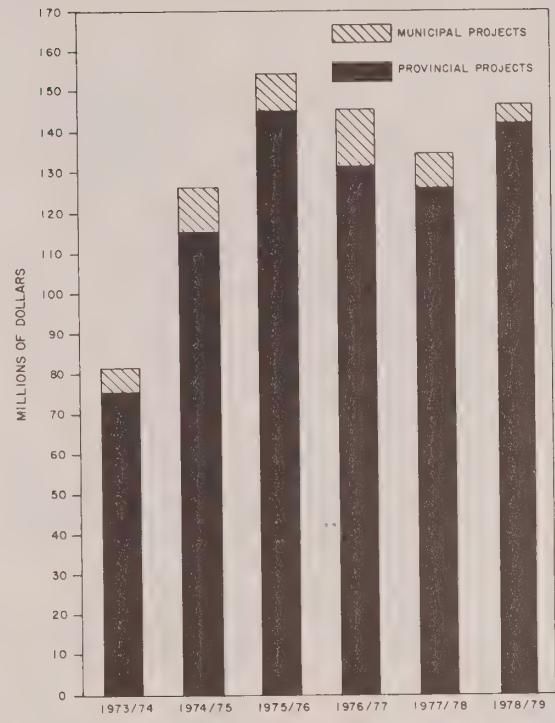
appendices

ANNUAL TOTAL EXPENDITURE
BY PROJECT TYPE



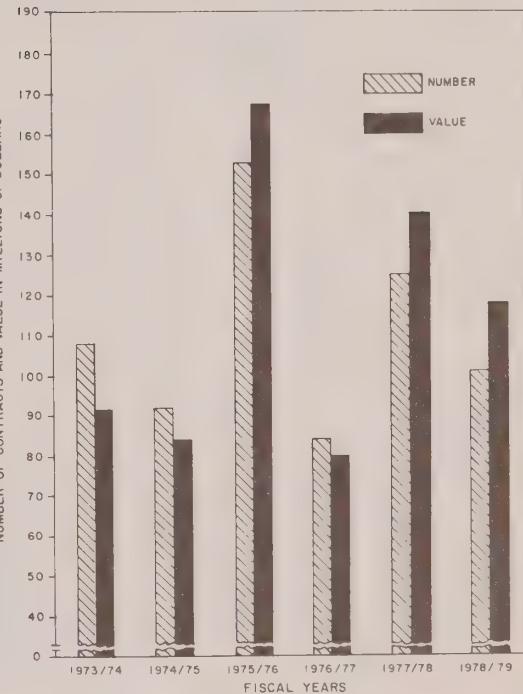
GRAPH I

ANNUAL TOTAL EXPENDITURE BY CLASS
Capital Construction Program
(Millions of Dollars)



GRAPH II

NUMBER AND VALUE OF CONTRACTS
TENDERED ANNUALLY



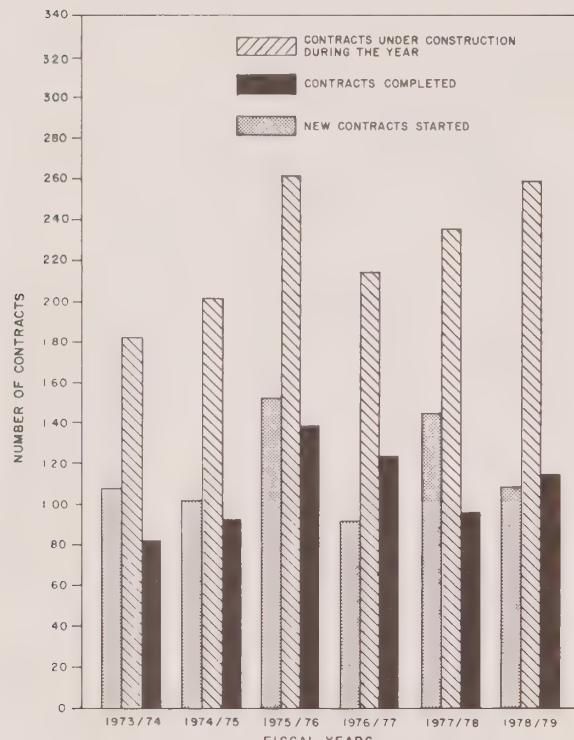
GRAPH III

F.Y.	Sewage	Water	Total
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3

F.Y.	Provincial Projects	Municipal Projects	Total
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3

F.Y.	Number	Value (\$ Millions)
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	101	118.1

ANNUAL VOLUME OF ACTIVITY
(Number of Contracts)



GRAPH IV

F.Y.	Started	Construction	Completed
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115

Notes:	
Number of Contracts under Construction in 77/78	236
Less: No. of Contracts Completed in 77/78	(-96)
Equals Carry-Over on to 78/79	140
Plus: No. of Contracts Started in 78/79	109
Equals Number of Contracts under Construction in 78/79	249

TABLE 1
Test Production, Central and Regional Laboratories

LABORATORY	1978-79	% Total	1977-78	% Change
	Tests x 1000	1978-79	Tests x 1000	
Water Quality	678	40	754	-10
Air Quality	284	17	299	-5
Organic Trace Contaminants	48	3	49	-2
Pesticides	84	5	103	-19 *
Physical Methods	29	2	15	+ 97
Microbiology	140	8	140	0
London	192	11	200	-4
Thunder Bay	104	6	84	+ 24
Kingston	143	8	136	+ 5
Total	1,702	100	1,780	-4

* While the test load was reduced, due to a decrease in the number of tests requested per sample, the actual number of samples processed rose by 18 per cent.

TESTS PERFORMED, 1978-79

LABORATORY	1978-79	1977-78	Tests x 1000	Tests x 1000	% of Total	
	1976-77	1977-78			1976-77	1977-78
Toronto Laboratory						
Water Quality	678	754				
Air Quality	284	299				
Organic Trace Cont.	48	49				
Pesticides	84	103				
Physical Methods	29	15				
Microbiology	140	140				
TOTAL TORONTO LAB.	1,263	1,360			77.1	76.4
London	192	200				
Thunder Bay	104	84				
Kingston	143	136				
TOTAL REGIONAL LABS.	439	420			22.9	23.6
TOTAL LAB. SERVICES BR.	1,702	1,780			100.0	100.0

London	192	200				
Thunder Bay	104	84				
Kingston	143	136				
TOTAL REGIONAL LABS.	439	420			22.9	23.6
TOTAL LAB. SERVICES BR.	1,702	1,780			100.0	100.0

TABLE III
TRAINING & CERTIFICATION SECTION
STUDENT INTAKE

JUNE, 1978 — JUNE, 1979

NO. OF COURSE	COURSE	MOE	MUN.	IND.	O/S PROV.	TOTAL
3	Acoustics Technology	16	12	3	—	31
1	Acoustics in Land Use Planning	6	2	5	1	14
4	Activated Sludge Workshop	34	47	11	3	95
7	Basic Gas Chlorination	53	86	1	24	164
4	Basic Sewage Treatment	42	37	13	—	92
3	Basic Water Treatment	36	36	6	1	79
2	Construction Inspectors	2	47	34	2	85
3	Industrial Air Abatement	6	—	—	—	6
1	Maintenance Gas Filters	14	8	—	1	23
3	Preventive Maintenance	27	38	3	—	68
2	Primary Treatment	19	20	—	1	40
3	Pump Operations Workshop	29	36	—	2	67
1	Sewer & Watermain Design	3	33	20	—	56
1	Gas Testing	—	20	—	—	20
3	Surface Water Treatment	24	20	2	2	48
1	Visible Emissions	77	—	—	—	77
2	Monitoring Water/Wastewater	21	10	1	—	32
1	Air Pollution, Seminar	106	—	—	—	106
1	Pump Operations Seminar	60	40	—	—	100
1	Control of Industrial Waste	48	—	—	—	48
1	Nitrification Seminar	52	—	—	—	52
1	Op/Mtc: Water Distribution	2	17	—	—	19
1	Rescue & Safety	—	24	—	—	24
TOTAL:	—677	533	99	37	1,346	

TABLE IV

ONTARIO'S AIR POLLUTION INDEX

DATE STARTED

TORONTO MARCH 23, 1970 WELLAND JAN. 1, 1974 (CLOSED OCT. 26, 1978)
 HAMILTON JUNE 15, 1970 NIAGARA FALLS NOVEMBER 1, 1974
 SUDBURY JANUARY 16, 1971 CONISTON FEBRUARY 18, 1975
 WINDSOR MARCH 19, 1971 NEW SUDBURY MARCH 1, 1976
 HAPPY VALLEY MAY 13, 1971 SARNIA (14049) DEC. 1, 1977 (CLOSED AUG. 30, 1978)
 (CLOSED JAN. 1975) SARNIA (14064) SEPTEMBER 1, 1978







